

Govt is tied up in red tape — CSA

by Philip Hunter
THE government's computer purchasing is too bogged down in bureaucracy and it fails to make enough information on its computer needs available to possible suppliers, according to the Computing Services Association.

Peter Parkinson, chairman of the CSA working party on government procurement, said: "My own company, Data Logic, had in one case to withdraw from a contract because of the cost of preparing a tender."

And Parkinson, whose committee is considering the response last Monday by the government's computer adviser, the CCTA (Central Computer and Telecommunications Agency) to last year's CSA report said he was disappointed that the agency did not intend to publish outline schedules of intended government procurements.



PERKINS...Joined attack on government bureaucracy.

Miners fear automation could cost 165,000 jobs

by Andrew Thomas
A SECRET report commissioned by the National Union of Mineworkers claims that 165,000 jobs could be lost within five years as a result of new technology. Researchers from the University of Bradford presented the report to the NUM last December, and the union is to set up a committee to discuss its implications.

UK systems houses in row with DEC

by George Black and John Kavanagh
A MAJOR row has blown up between US minicomputer giant Digital Equipment and some of its big UK systems houses over the way the market is split between them. The systems houses say DEC is virtually ordering them to pull out of markets in which they have invested millions of pounds of software development.

survey of the DEC market in the US, which the company put before a meeting of turnkey systems house members of the Computing Services Association. DEC OEM marketing manager Stuart Haughton said the study showed that systems houses would have trouble selling general software such as accounting packages unless they could add value by aiming at specific types of businesses.

But Neville Cerfontyne, director of one of DEC's 10 UK authorised computer distributors, Hoskyns, slammed Haughton's conclusions and said DEC could not handle the market for these general systems itself.



EARL... "The £2 million has been ploughed into R&D".

Quest spends Arabs' £2 million

by Andrew Thomas
THE £2 million cash injection received by Quest Automation when it sold off 51% of its CAD business to Arab venture capitalists has been spent. And there may be a risk that if Quest cannot come up with more cash, its remaining 49% share in its CAD subsidiary may be reduced.

"super" UK CAD company involving Quest, Compesa, and Racal Redac. "There's no doubt that the deal would have been the best move for the British CAD industry," he said. "The CAD business is all about growth, and there aren't any engineering companies growing at the moment."

"In three years' time it will be different, and we must be in the position to respond to growing demand."

Robots pose no threat to Nissan car workers

by Philip Hunter
CAR maker Nissan of Japan last week gave its union a world's first pledge that workers would not suffer from increasing use of robots. The novel social contract guaranteed that workers will not be demoted, suffer wage cuts, or worse employment conditions through introduction of robots.



Part of the union?

Firms rush to join IT project

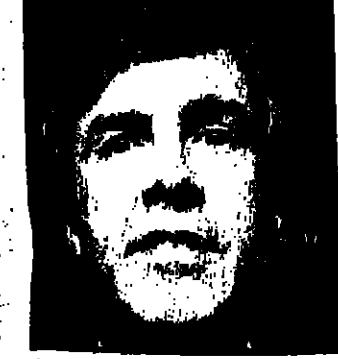
by John Riley
THE European Commission has been swamped with nearly 200 tenders for 16 one-year pilot projects in the Esprit programme, Europe's strategic plan for information technology.

There are 620 individual organisations represented in the 200 applications, which have a total value of some £69 million.

The successful applicants will have to pay half the cost of participating in the projects. The EC is putting up the other half to a total limit of about £7.2 million.

Control Data buys Arbat

by John Kavanagh
UK SYSTEMS house Arbat has been bought by Control Data. The US computing giant will use the acquisition to spearhead its expansion in the banking market.



BARBE...Set for rough ride.

"They were telling us not to get into the software and services market which we're already in," he said after the meeting. "They were saying we could go for vertical markets but not for horizontal ones, on which we've already spent millions."

"I didn't accept that our major market sectors would no longer be open to us. DEC is not capable of serving them because it doesn't

have the expertise — nor do the other manufacturers. This was totally unacceptable as far as OEMs were concerned."

Later Haughton said: "I wasn't going in to beat up the OEMs but I was indicating the world was changing with the advent of the personal computer. There is a good future for OEMs if they adapt to this changing world."

California job hoppers

by Howard Kartin
CALIFORNIA, widely regarded in the US as the trend-setting State, may have started another ball rolling.

Job-hopping by top management at several California hi-tech firms appears to be on the increase.

In Cupertino, Tandem Computers has lost company co-founder Michael Green and US marketing vice-president Charles Ryle. Tandem said Green left "to pursue personal interests."

Both departures come only two months after the departure of Tandem co-founder James Katzman.

San Diego graphics vendor Megatek last week lost Peter Shaw, its president and chief executive officer, as well as three other high executives. The four have founded a new firm, Syte Information Technology.

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LINE NOISE

THORN EMI Datatech, the major British Telecom low-speed modem supplier which has got itself into the low-cost micro end of the industry through subcontract assembly of the Sinclair Spectrum and the Grundy Newbrain, is preparing to launch a low-cost videodata interface for micros — possibly under its own name this time.

WATCH out for the Star Computer Group over the next 18 months. The systems house's takeover of rival Hartley was a great move, says stockbroker Smith Keen Cutler, because it doubled the firm's user base. Despite the costs of the takeover Star Computer's pre-tax profit was up 15% in the first half of 1982-83 and could reach £1 million at the year-end in April. Next year the company will get the full benefit of the Hartley takeover, says Smith Keen Cutler, with profit rising "very sharply" to £1.5 million.

Industry leaders go to market

From front page
this year's chairman of the Computing Services Association. "There hasn't been enough emphasis in the report's proposals on building bridges between development and commercialisation. We shall be pressing for these issues to be dealt with."

BTG clears deck for major change

From front page
subsidiary, Insec, which finally disappeared last year. The technology transfer role raises the possibility of the group becoming closely involved with the implementation of the Alvey Committee proposals on the future direction of computing research. Both the group and the Alvey Committee report to the Department of Industry and both are concerned with technology transfer.

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by staff and 75% by merchant banker Arbutnot Latham. That company was taken over last year by the Dow Bank group of Zurich, which put Arbat on the market.

"Dow did not see a UK systems house as part of its long-term plans," Harris said, "so for the last 10 months we have been looking for someone we could work with. That included very few UK companies."

Harris added that Arbat would keep its own identity but would also use Control Data's outlets in 47 countries to give it a far bigger market penetration.

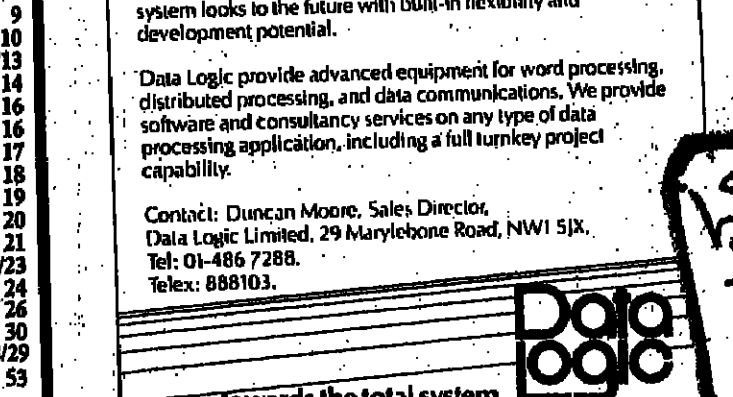
The new backing would also bring Arbat's product development forward but it would not be diversifying from banking applications, said Harris.



Sparks fly over software report



French mobilise on DP education



Amdahl cleans up — and heads for \$1bn

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Minister says robots create jobs

by our Parliamentary Correspondent

ROBOTS create at least as many jobs as they destroy, the Commons was told last week by Under-Secretary for Industry John Butcher. A study of the impact of robot technology on employment in manufacturing industry had cleared robots of the charge that they were a cause of the current high unemployment, he said.

There were considerable benefits to employment as a result of increased competitiveness and investment, he said. Butcher also spelled out what government investment was available for companies developing robots.

Grants of up to half the cost of consultancy studies of the installation or manufacture of robots were available from the Department of Industry. Companies could claim one-third the cost of installing robots, and one-third of the cost of developing new UK robots.

The Science and Engineering Research Council also made grants available for joint projects between universities and industry.

The Lords heard from Lord Glenithorpe that the government had allocated £5 million for the development of information technology for the disabled this year. There were a number of initiatives to help the disabled with new technology.

Trade Minister Peter Rees has told a group of London businessmen how Britain is becoming more dependent on investment from Japan and the US. He cited the decision of Digital Equipment to establish its main office automation research centre at Reading in the middle of the UK's "silicon valley". IBM had decided to make its new Personal Computer at Greenock in Scotland, and Mitsubishi was to build video tape recorders at Lowestoft and Edinburgh.

Hitachi had invested in building video tapes at Telford, and Unimation was expanding its UK production of industrial robots.

And a Lord's select committee backed the Alvey report - see page 3.

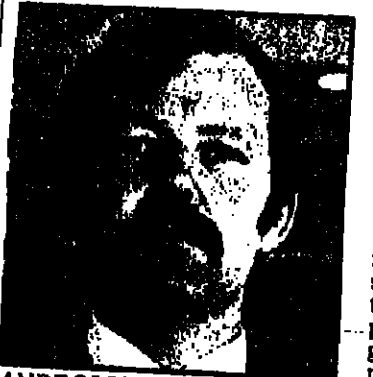
Sparks fly over software report

by George Black

THE battle for the money-spinning micro software market for accounting packages heated up this week as leading companies clashed over a controversial report.

Commissioned by Compact Accounting of Dorking, Surrey, from one of the UK's top 20 accounting firms Stoy Hayward, it compares four competing products: sales, purchase and nominal ledgers from Compact, Peachtree, Tabs and ACT Pulsar.

The report concludes: "Com-



ANDROLIA... "Rubbish".

TI, Harris link for semi-custom chips

by John Riley

A NEW team to exploit the semi-custom chip market has been formed by semiconductor manufacturers Texas Instruments and Harris Corp. The move comes in the wake of a similar link between Motorola and National Semiconductor last August.

Both TI and Harris will act as alternate sources for the other's CMOS (complementary metal oxide semiconductor) and STL (Schottky Transistor Logic) gate arrays. Both can now offer a common system for circuit design and analysis.

While the second sourcing is important to establish market confidence in particular components, the most significant part of the agreement is the design automation link.

Both TI and Harris are offering the Transportable Design Utility (TDU) software package with the Transportable Integrated Design Automation Language (TIDAL) for circuit description. Such agreements involve close co-operation between companies which have to divulge many technical details.

Hannan Rose, technical assistant secretary for the BCS, has submitted an "originating application" to the Industrial Relations Tribunal which rejects the Society's claim to dismissal on grounds of redundancy.

Rose claims in the document that his dismissal was a result of a

fact provides the greatest accounting reliability of the four. It is by no means perfect, but it is unlikely that the perfect one has yet been written, particularly for micros.

The other three all attacked the basis of the comparison, arguing that "software snapshots" gave a distorted impression of work in progress.

The report said Compact's completeness and accuracy of input were the best and its printed reports and program generator Nucleus gave it an edge on output. The others gave difficulty on cash allocation, it claimed. Tabs' trail and Peachtree's and Pulsar's debit/credit symbols were criticised. But Pulsar was the only one with control over master file standing data. And only Peachtree and Pulsar gave security of access.

Pulsar managing director Brian Androlia retorted: "Their comment on our cash allocation is absolute and utter rubbish. This is the most dangerous accounting problem and it's where companies go out of control. If ledgers aren't properly balanced customers don't pay. Our system is complicated,

but it makes sure people do it right."

He rejected Stoy's point on symbols because it was standard accounting practice, he said.

Tab's founder Terry Poole cited the fact that Customs and Excise used its package for VAT training as evidence of its strength.

"Our nominal ledger on its own might appear weaker, but it integrates with more modules than most," he said.

John Hale, managing director of Peachtree International, said: "If they are making comparisons they should give some weight to the capability and commitment of the company providing the product. Our parent MSA put \$25 million into development last year."

He added that Compact used Peachtree's own file access method under licence. But Compact managing director Peter Branson commented: "They would say that, wouldn't they?"

Defending the report, Peter Darnell, Stoy partner and computer auditing head, said: "We told Compact before we started there was no guarantee they would come out best."

FLEET... "Thrust into large-scale networks".

NCR takes on IBM with 32-bit micro

by Boris Sedacca

HOT on the heels of Intel and Hewlett-Packard, NCR has launched a desk-top computer based on the 32-bit single-chip processor it announced last September.

NCR calls its new 9300 a mainframe, though it is housed in a desk-top package the size of a micro and has the power of a minicomputer.

"The NCR 9300 will spearhead our thrust into large-scale networks," said Rex Fleet, NCR chairman and managing director for the UK.

Phil Howard, NCR product manager for the 9300 added, "The 9300 has the power of an IBM System 38 with the price of a System 34." NCR does not expect

to replace System 38s but to add IBM's System 34 user base, many of whom are reluctant to migrate to the more complex System 36 environment.

The company is reluctant, however, to single out a specific IBM product range against which to target the 9300. NCR promises extensive data communication features to be announced at a later stage, including IBM's Systems Network Architecture, which would pitch it against the communications-oriented IBM 8100 and 8100 processor.

The machine is microprogrammable, and Howard disclosed that a microcoded IBM System 370 instruction set implemented in programmable read-only memory would be offered.

Standard project aims to ease trade

by Philip Hunter

UK EXPORTERS can look forward to an end to the costly paperwork required by Customs and Excise after successful completion of a £250,000 European project to test an international standard for exchanging information between different makes of computer.

Vauxhall and the UK Customs and Excise are being linked to the computers of General Motors and other groups in Belgium and West Germany to exchange invoices and Customs data using a standard supported by the United Nations.

The project, called Mercator, is being run from the UK by Sitpro, the Simplification of International Trading Procedures Board, a government quango set up to assist

exporters by promoting communications standards.

Mercator is being funded half by the organisations whose computers are being linked, and half by the European Economic Commission, which wants the Sitpro standard to become the norm.

The Sitpro standard is already used by 100 companies to send details of exports from their computers to the Customs and Excise computer. But this is done mostly by magnetic tape, and other companies still send printed documents to the Customs and Excise.

The aim of Mercator is to cut out this red tape and replace it with automatic transfer of invoices and Customs information between computers.

Dismissed official takes the BCS to tribunal

by Boris Sedacca

AN ACTION for unfair dismissal is being taken against the British Computer Society by one of its officers who is seeking reinstatement.

Hannan Rose, technical assistant secretary for the BCS, has submitted an "originating application" to the Industrial Relations Tribunal which rejects the Society's claim to dismissal on grounds of redundancy.

Rose claims in the document that his dismissal was a result of a

personality clash with BCS secretary-general Derek Harding.

Rose told *Computer Weekly*: "I very much regret what has happened. In view of the work that clearly has to be done, I just cannot accept that there was a redundancy. I would not wish to discuss the matter further in view of the fact that an application has been made to the Industrial Tribunal."

Derek Harding declined to comment at this stage.

The application contends that the dismissal was unfair because

the applicant was not consulted about it, was not offered alternative employment, and was not selected for dismissal on the basis of "last in, first out".

"The applicant was dismissed with three months' notice by letter dated February 1, 1983, purportedly on the ground that he was redundant, and on February 18, 1983, was requested by the respondent (the BCS) Establishment Committee to leave its employment on February 23, 1983," the application states.



ROSE... "Personality clash".

UK top jobs switch at Storage Technology

by John Kavanagh

EUROPEAN growth at the IBM-compatible disc and tape system supplier Storage Technology has led to a management reshuffle at the top of the US firm's international operation. In the UK the company has a new managing director and has regrouped its major customers into four application areas.

UK managing director Derek Thompson is moving to the one had had as printer manufacturer Documentation, which Storage Technology took over on 1980. He is taking over responsibility for Belgium, Italy, the Netherlands and Switzerland from Doug Bailey, who will concentrate on the bigger markets of France, Germany and the UK, plus distributors.

Thompson and Bailey will be based in the UK. Meanwhile Brian Molloy is moving from UK deputy managing director into the top job vacated by Thompson.

"These moves are being made because of our growth in Europe,"



THOMPSON... Taking on an international management role again.

said Thompson. "In the UK for example we doubled our installed base in 1981 and increased it by a third last year."

"I am taking some of the pressure off Doug Bailey by taking over the smaller countries."

The regrouping has brought new jobs for some engineering and

branch managers. Systems engineering services manager Clive James becomes business development manager of the government and public utilities sector, Graham Shelley takes on finance and transport, Ray Dodds gets insurance and David Howarth manufacturing.

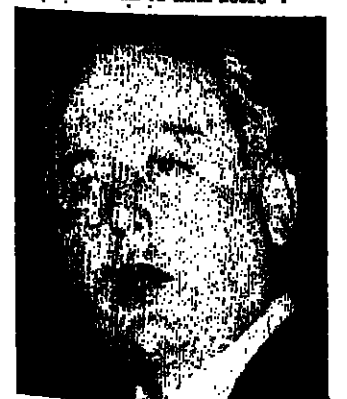
Consumers hit at privacy proposals

by John Riley

ANOTHER attack on the Data Protection Bill was mounted last week by the Consumers Association.

The Association, the private organisation funded by subscribers to *Which?* magazine, thinks that the powers of the Registrar are not defined and that the Bill may not fulfil the Council of Europe's draft convention for the protection of individuals.

Rex Goldman, director of the Consumers Association, wrote to Home Office Minister David Waddington last week to complain that "as now drafted the Bill succeeds in being neither helpful to data subjects nor fair to data users".



WADDINGTON... Complaints from consumers.

Don't let them get away with computer fraud - police

by Philip Hunter

COMPUTER fraud cases are not being reported to the police. The result is that the police are not getting the experience needed to stop what is believed to be a fast-growing crime.

This is the view of the West Midlands fraud squad, which has not yet had a single case of computer fraud reported. And the head of the fraud squad, Detective Superintendent Harry West, does not believe that this is because there are no such cases.

"We are aware that people are using computers to steal money," says West. "The problem is that companies are often too embarrassed to report their own employees to the police."

Another reason why companies are not reporting computer crimes

is because they do not believe the police have the necessary training to deal with them, says West. "But we haven't the experience because no one bothers to report them."

West says he is not touring for business, and hopes that the fraud squad will not suddenly be deluged with trivial cases such as abuses of computer time. But he wants the general attitude to change.

At present there are only one or two detectives specialising in computer fraud in the UK police forces. But the West Midlands squad has added a week of training in computer fraud to its four-week fraud training scheme open to all UK police forces.

"If we need expert evidence, we ask experts to give us information," says West. "But we have to have a working knowledge."

Peers press the govt over Alvey

by our Parliamentary Correspondent

THE government has come under new pressure to give full backing to the Alvey Committee's proposals on fifth generation computing research - this time from the House of Lords Select Committee on science and technology. The committee says the UK electronics and computing industries have a bleak future unless the government introduces a firm support policy.

This latest attack puts the government under intense pressure from all sides to fund the Alvey proposals and put together an information technology industry policy.

Last month the influential National Economic Development Office, representing industry, unions and government departments, said there was an "unprecedented level of willingness of com-

panies to co-operate with each other" in the light of the Alvey report. A week later NEDO said the UK could be out of the information technology business by 1990 unless the government, the industry and users acted quickly. And last week it emerged that industry leaders were lobbying senior government officials over the need for public money to support marketing.

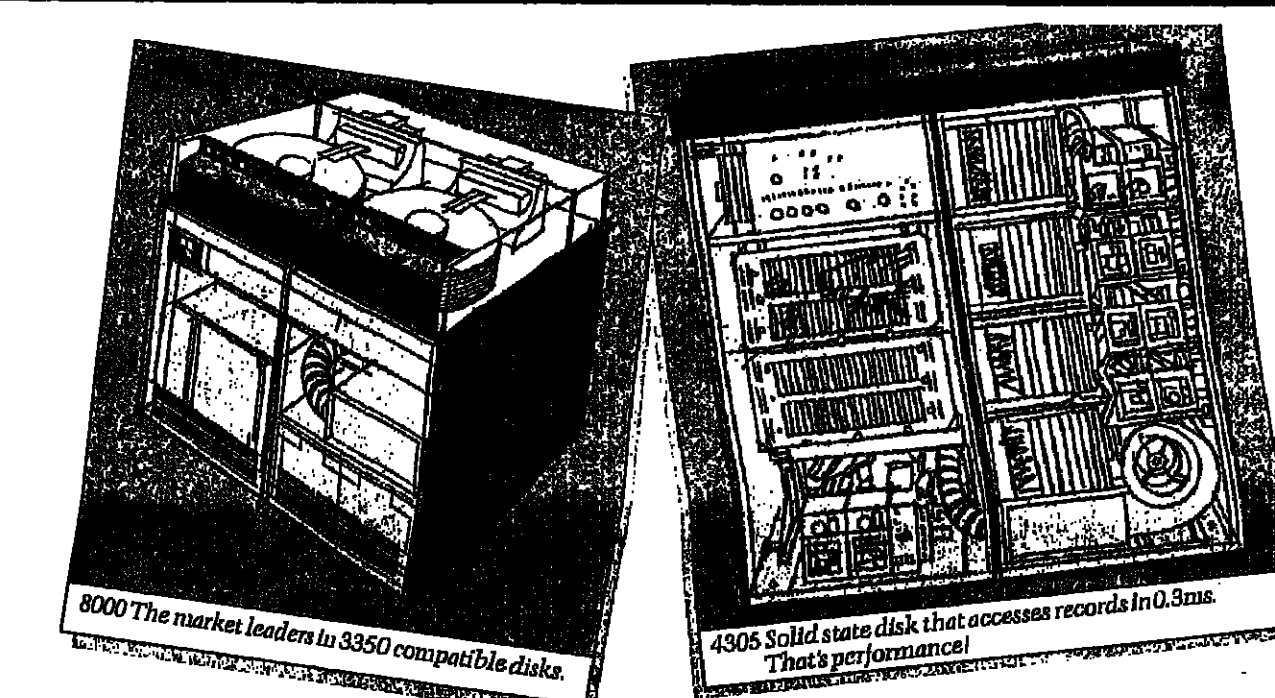
The Lords committee says government resources and public purchasing policy should be geared to the strategic guidelines laid out in the Alvey report. Product development funds should be set up to channel private investment into specific projects in existing companies, but at the same time young engineers should be exposed more to foreign expertise and competition and the government should act as a broker for the import of suitable technology.

The committee also calls for more research funding: "Capital equipment in support of research and development calls for government funding. If high technology research and development is to be pursued in areas like microelectronics there will be a need for extensive capital re-equipment in the electronics industry."

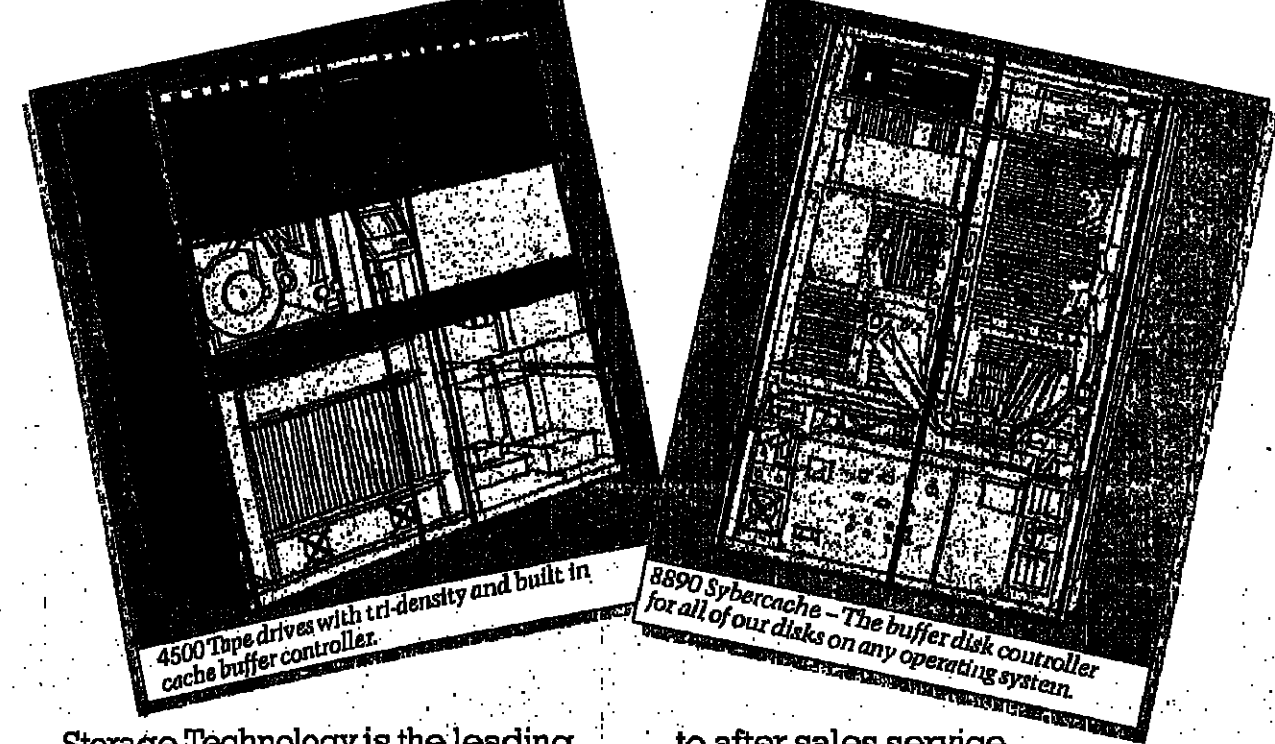
It says the Department of Industry should be prepared to take more risks with its research funds: "Research and development by its very nature is speculative."

More high technology centres are needed, says the committee. It believes at least six universities should be singled out to handle contract research.

And the committee adds: "The option of letting industries grow and contract in an international free market without any associated government policy is no longer open. In such circumstances British industry would quickly contract."



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Commodore to build Corby plant

by Robert Parry
COMMODORE is to set up a £20 million plant in former steel town Corby to make its micros in Europe.

In addition to the money Commodore is investing in the UK plant, there will be about £2 million of government grants for the plant from the Department of Industry if Commodore lives up to its proposed employment levels. Corby is in a Development Area, and has an Enterprise Zone.

The Corby plant will become Commodore's European manufacturing and distribution centre for the lower end of its personal computer range. Vic-20s and Commodore 64s will be assembled there for all of Europe, at a rate that should reach 700,000 units a year by late 1984. The plant in West Germany, at Braunschweig, will continue to build the 700 and 500 series business machines.

In splitting the parts of its product line between different manufacturing sites like this, Commodore is following other US-based

companies with European assembly operations. For example, Hewlett-Packard builds its personal computers in France, the business machines in Germany, and will make disc drives at its Bristol UK plant.

The placing of the personal/home computer assembly in Britain rather than expanding the factory in Germany reflects the different strengths of the respective markets. Commodore has sold over 120,000 Vic-20s in the UK, a tenth of its claimed worldwide total. There are many companies frantically writing application software for Vics and 64s here, and Commodore wants to be close to them and cash in on their products.

Commodore will move into one of several existing buildings in Corby waiting for occupation, and hopes to be under way by the beginning of July. The assembly line will be shipped in from Germany, and assembly staff hired locally.

A factory manager has yet to be appointed.

Production was planned to start considerably earlier, preferably by April, but the deal took longer to set up than Commodore anticipated. In common with other personal computer builders, Commodore has suffered a chronic shortage of stock to sell to customers in recent months.

Initial production will satisfy the booming UK domestic market, but it is intended that the plant will assemble machines for the rest of Europe. As much as two thirds of the plant output may go to exports.

Commodore turned in record sales for the second quarter of this fiscal year, up 151% over the previous year to \$176 million. Net income was up 147% to \$23 million. These figures took the first half sales to a 125% increase over the first half of fiscal 1982. After the US and Canada, the UK was the most significant country for Commodore, achieving record sales in all business areas.

by George Black
OPERATING systems vendor Vector International is moving into applications packages since its main suppliers opted to take over their own marketing in Europe.

Belgian-based Vector was the main outlet for both Digital Research's CP/M systems and Microsoft's MS-DOS on the continent. Its collaboration with Microsoft ended when Microsoft became a direct rival of Digital for the booming micro operating systems market and a clash of interests would have arisen.

Vector, which continued to represent Digital exclusively in Europe up to the end of last year and continues to sell its products to the end of 1983, has now been forced to look for a new role.

"We had a substantial part of our business in operating systems and since that is going away from us we've decided to move into

another area," said Vector's director of standard software Jim Porzak.

"There's now much more awareness both in the UK and in Europe that applications are important. What sells micros now are packages that people can use. So we feel it's the right time to make this shift."

Vector gets half of its £2.6 million revenue from software products - the other half coming mainly from micro engineering interests. It will be building on market experience gained in the promotion of CP/M and MS-DOS to seek a high income from its new range. And it has chosen Chang Labs of California to supply it with word processing and financial planning systems.

Though only five years old, Vector will be senior partner in the arrangement - Chang was set up only two years ago.

Vector moves into the package market

PORZAK... "What sells micros now are packages that people can use."

by John Kavanagh
THE satellite communications business started to take off for IBM's Satellite Business Systems in 1982, the company's first full trading year. In a year in which it launched its third satellite, established an international link with British Telecom and started a telephone service for domestic users, SBS enjoyed a seven-fold increase in revenues to \$39.1 million.

Profitability will take longer. The company says it expects to make a profit in 1984. Meanwhile it has the security of assets worth \$14 million, including three satellites and ground stations in 20 countries.

The NASA Space Shuttle will take a fourth satellite into orbit next year.

SBS now has 17 big companies, including General Motors, General Electric, Westinghouse, United Airlines and a number of banks among the customers for its digital data, voice and video transmission services. Speeds of 1.5 Mbits a second are offered.

The international service is used by Intercontinental Hotels to communicate between the US and London.

SBS is owned by IBM, the satellite firm Comsat and insurance group Aetna Life and Casualty.

IBM comms in orbit

results for the three main project groups involved in the new study.

The main team at Kyoto University will build a language processing software system designed to analyse and translate Japanese sentence structures into their English equivalents.

JICST itself will complete a computerised dictionary containing 690,000 technical words in Japanese and English. The more technical and complex task of preparing the non-technical verbs and words will be handled by the Ministry of International Trade and Industry (MITI).

Both Fujitsu and Hitachi are running independent efforts in the machine translation field and both companies hint that they are well ahead of the government project, although they will be co-operating with it.

Fujitsu began its efforts in 1978 and has 12 staff evaluating a simple technical translating system which is in operation in an academic town close to Kyoto University.

Japan sets up translation system project

JAPAN has set up a three year project aimed at producing an English/Japanese computerised translation system.

A prime mover in getting the project underway has been the Japan Information Centre of Science and Technology which spends \$11 million each year, most of it on translating English documents into



Logica's system will replace BART's 13-year-old controls.

Logica takes train West

by George Black
LOGICA has won a £1.6 million contract to design a new rail system for San Francisco, against tough international competition that included Informatics and Boeing Computer Services.

The system will replace the Bay Area Rapid Transit Authority's 13-year old controls, which are based on a bespoke piece of hardware from Westinghouse.

A joint Logica/BART team of 20 aims to produce a specification for the project by September, when the hardware contract will be put out to tender. Most of the major computer manufacturers are expected to be interested, as well as smaller firms specialising in resilient systems, such as Tandem and its new rivals Synapse and Stratus. Logica specialists will be moved to the West Coast from London and New York.

The job is the first of its kind to be undertaken by Logica in the US, though other transport systems have been developed by them in this country. Logica has had offices in San Francisco since the company began its American operation in July 1981, but has concentrated mainly on banking systems, its major client being the Bank of America.

The system will monitor and

schedule the running of trains over some 71½ miles of track, serving 2½ million people around the bay. One of the aims is to reduce the intervals between trains from 3½ minutes to 2½.

Another is to overcome the present limitation on volume of traffic and help extend the scope of the system to more trains and more track. The ageing Westinghouse equipment, though still reliable, is

not up to handling the increased volume of trains which are needed.

BART is among the most automated rail systems in the world and carries 190,000 passengers each day between 34 stations.

Logica's president in the US Peter Harbridge described the award of the contract as a major coup which marked a completely new direction for the American branch.

by George Black
COMMODORE is to set up a £20 million plant in former steel town Corby to make its micros in Europe.

In addition to the money Commodore is investing in the UK plant, there will be about £2 million of government grants for the plant from the Department of Industry if Commodore lives up to its proposed employment levels. Corby is in a Development Area, and has an Enterprise Zone.

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Commodore to build Corby plant

SALES BRIEF

Navy gives Ferranti a £5m order

FERRANTI has clinched a £5 million contract from the Ministry of Defence to upgrade the Royal Navy's training simulator at the School of Maritime Operations in Hampshire. The order includes the replacement of machines to simulate aircraft, submarines, helicopters and hovercraft, and the installation of a Ferranti Lap Screen Display.

Peace links

COMMUNICATION between the £350 million Jet project to harness the power of the hydrogen bomb for peaceful purposes, and computers at the nearby Atomic Energy laboratories in Harwell, Oxfordshire, are being speeded up by a system being installed by Gannet Datacomm UK. Experimental data will be gathered on a network of minicomputers at Jet's Culham laboratories and passed to Harwell's big mainframes for storage and further analysis.

Touch of the sun

SPANISH tourists will soon be helped in their effort to get away from the summer plague of worshippers in their country by a viewdata system just bought from Modcomp by the tour operator Teletour based in Madrid. Teletour will offer other tour operators the ability to display glittering holidays and make reservations through the Viewman system based on a Modcomp Classic 1125 computer.

Telex update

TELECOMS giant Standard Telephones and Cables (STC) has started to deliver devices to update old telex terminals as part of a £1 million order from British Telecom. The units convert the signals from the old alternating electric currents to an audio base which will be the future standard for telex signalling.

CAD investment

CIPER Systems has put over £500,000 in CAD and test equipment to help build microcomputers and terminals at its factory in Melksham. The system is based on a Digital Equipment Vax computer and Ciper's own 2652 terminal.

Atomic arrays

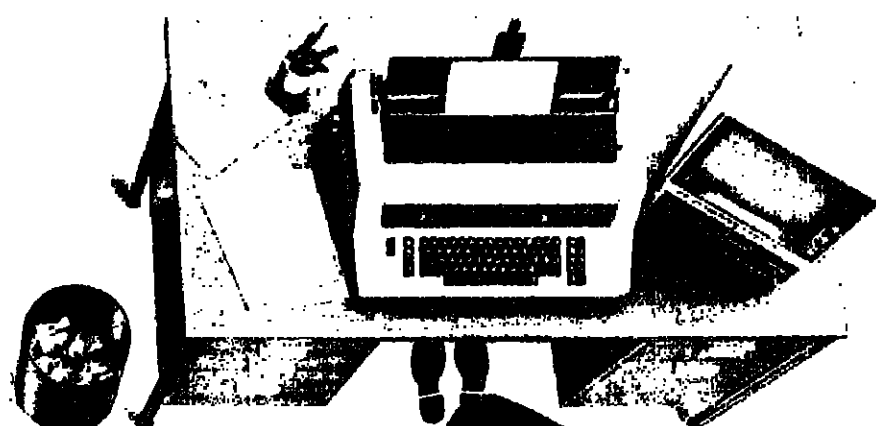
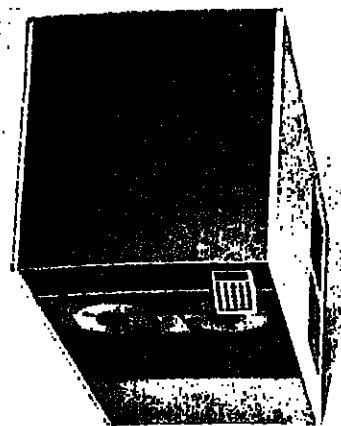
FLOATING Point Systems has sold one of its powerful PPS-100 array processors to the Atomic Energy Authority for the laboratories in Rutherford, Cheshire.

BT contract

BRITISH Telecom has dropped a £300,000 contract at the feet of MBS Microtex of Windsor to supply 15 turnkey network packages. Based on the Alcoa 64-bit microcomputer and running on the Unix operating system, the networks will be used for BT's National Network Service.

Bedding down

BED MAKER Silent Night has ordered a shop floor data collection system from SL Systems to track the progress of mattresses and divans through their production. The system makes use of light pens and bar codes and is based on a Digital Equipment PDP 11.



A step-by-step guide to what our competitors call a fully automated office.

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French mobilise on DP education

by Jack Gee
FRENCH President Francois Mitterrand has announced that graduates of the Polytechnic School and other elite colleges will now have the choice between doing their normal 12 months military service and training unemployed youngsters in elementary computer technology.

The government's aim is to avert the danger that France will lack 50,000 trained data processing engineers and technicians by 1990 and be unable to meet the shorter term targets of the five-year electronics plan (La Filière Electronique).

As a first step, 12,000 graduates

from 110 university colleges and other institutes of higher education are to be mobilised to give computer courses, a scheme proposed by Servan-Schreiber at the beginning of this year.

Mitterrand has told his advisers he is very worried about the risk that France will not be able to meet its objective of catching up with Japan in electronics and data processing techniques by the late 1980s.

Announcing his crash recruitment decision before France's top university teachers at the World Centre for Data Processing and Human Resources, the President

said: "We have to equip France with the industry which it needs in order to cope with the one thousand and one problems which it has to tackle".

Mitterrand added: "This will involve a massive training effort to which we must harness ourselves. It is regrettable that so much time has been lost over the last few decades".

The first pupils for the new data processing training scheme will be young jobless people between 16 and 25 years of age.

The government plans to open 20 special training centres for this purpose, half of which will be operational this year.



MITTERRAND... Worried that France will not catch up with Japan.

Gresham Trust puts £250,000 into Amida

by John Kavanagh
A £1.1 million systems house is getting a £250,000 cash investment from venture and development capital company Gresham Trust, part of the Eagle Star insurance group. And Amida Systems has certainly impressed Gresham Trust: this is the company's first investment in a computing firm.

With this new backing, which gives Gresham Trust 30% of the company, Amida expects to more than double its business to over £3 million this year, while profits are set to grow from £86,000 to £250,000.

Amida was formed in 1978 as a software house but it now has three hardware product ranges of

its own, two of them designed by Amida and built by an unnamed BBC company.

At the bottom is the Sovereign, a family of eight-bit and 16-bit CPM microcomputers based on the Zilog Z80 and Intel 8086 processors.

The mid-range 1600 series is a 16-bit S100 bus system supporting up to 16 workstations. And at the top of the range Amida sells minicomputers from the Scandinavian supplier Norsk Data.

Amida's software includes production control, retail and distribution packages. Plans for the next three months include the launch of an Amida-designed microcomputer.

Divorce gets quicker

by John Riley
DIVORCES, conveyances and wills can now be processed more efficiently by junior legal staff using three software packages launched last week.

Oyez, the traditional supplier of lawyers' stationery and printing requirements, and which also has a computerised legal support section, is offering a new series of Oyez Legal Support Systems.

The first three packages are for residential conveyancing, probate

and undefended divorce. Personal injuries litigation and County Court debt collection packages are to be offered soon.

Each package, which can run on any word processor able to support Wordstar and with a CPM 86 operating system, incorporates many of the appropriate legal forms and standard legal correspondence. Coded recurrent details, such as names and addresses, are then inserted into the documents in the correct sequence.

BT boss' 21.4% rise

BRITISH Telecom chairman Sir George Jefferson has received a 21.4% pay rise from the government. This boosts his salary from £37,650 to £70,000, and makes him the highest paid boss of the nationalised industries.

Jefferson's fellow BT board members also get rises, averaging out at 15%.

But even after the £12,000 rise, Jefferson still has a long way to go to catch up with STC chairman and chief executive Sir Kenneth Corfield, who last year received over £120,000 salary.

Honeywell opts for TTL technology

by Andrew Thomas
HONEYWELL has turned away from the techniques used in its top-end DPS 88 machines and introduced two new mid-range machines based on conventional technology. The new DPS 8/47 and 8/49 models utilise the same architecture as the 8/20 and 8/44, but offer an 80% price/performance improvement.

But large systems product manager Brian Skedd denies that the use of Fairchild fast transistor-transistor logic (TTL) technology signals the end for the current mode logic (CML) used in the large scale DPS 88/81 and 88/82 launched last October.

"TTL versus CML is a question of economics," says Skedd. "The 8/47 and 8/49 are entry-level machines competing with mid-range IBM 4300s and ICL 2966s, but for the high-performance machines, CML is the best in terms of speed, low power requirements and minimal heat generation."

The new models offer a significant price/performance improvement over their predecessors, the 8/47 costing the same as the 8/20, which remains in production, but offering an average performance increase of 86%.

A DOS 8/47 equipped to run the

GCOS 8 operating system will cost £95,500, and a DPS 8/49 £156,000. Versions are also available with extra mainstore enabling the Xerox Sigma CP-5 operating system derivative CP-6 to be run.

CP-6 was originally introduced to service the ex-Xerox customer base after the Honeywell takeover three years ago, but Skedd says the system is finding favour in scientific and engineering areas.

And it looks as if CML will remain the prerogative of large systems for the next few years.

"TTL technology will stay around at this level of machine for the next generation," says Skedd. "CML will service the top machines, and ECL (emitter-coupled logic) is not the way ahead for Honeywell."

Current mode logic, as its name suggests, relies on changes in electrical current rather than voltage, to operate its gates. Only Honeywell and NEC use the technique, which is claimed to be five times faster than conventional TTL and offers switching speeds of less than a nanosecond.

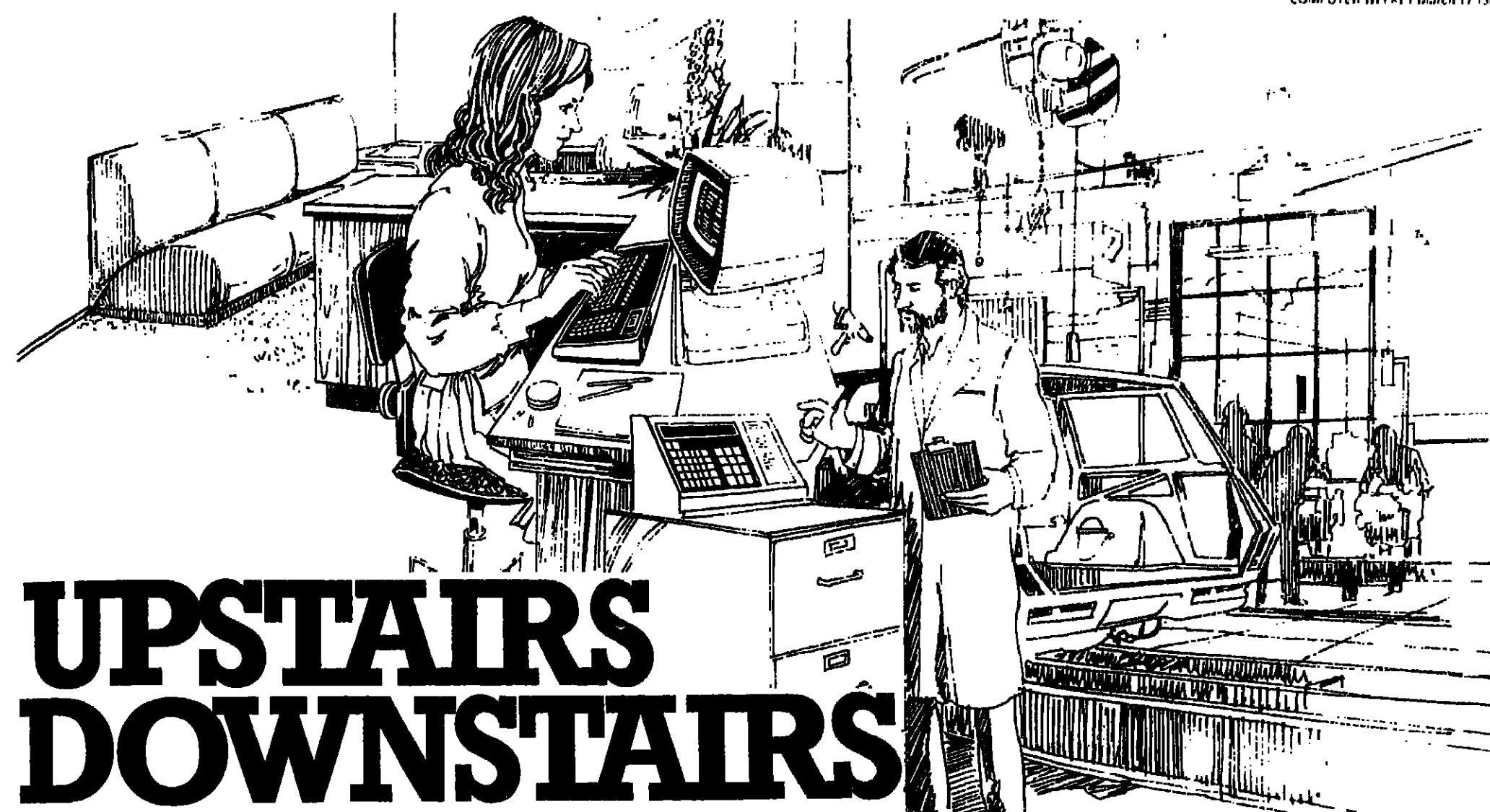
Power requirements are reduced to around 10 milliwatts per gate, and more gates per chip can be accommodated due to only two transistors being required for each gate.

CAD/CAM giant reports fall in profits

CAD/CAM giant Computer has reported a profit for 1982 of \$32.4 million, a drop from \$33.4 million the previous year. Revenues rose 20% to over \$1 billion from \$270.7 million.

For the fourth quarter, revenue stood at \$81.7 million compared with \$76.3 million for the same period the previous year. Profit for the quarter was \$7.2 million, a drop from the previous year's figure of \$9.3 million.

"While we remain cautiously optimistic and anticipate a slight improvement over the next quarters, we expect that the impact of an economic recovery will not be felt until the latter half of 1983," said James Berrett, president and chief executive of Computervision.



UPSTAIRS DOWNSTAIRS

Whilst many companies may consider automating their offices, they seem happy to let the factory follow its old traditional methods. Upstairs—word processing, automated accounting, and computerised ledgers; downstairs—job sheets, movement dockets and stores notes.

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IBM extends PC and drops prices

by Robert Parry
PRICE cuts, more storage, and an updated operating system were announced for the IBM Personal Computer last week just two months after its UK launch.

The new Winchester-disc IBM Personal Computer XT (for extended) can give 20 Mbytes of disc storage, rather than the 540K maximum on the earlier floppy-only machine. An expansion unit will allow hard discs to be added to the original PC.

And the price of the original PC has been cut. A reduction in the cost of floppy drives of over 30% gives a drop in the system price of about 6%. This follows a US price cut of around 15%, seen as a move to counter the rash of compatible machines from rival manufacturers.

The new products will not be available for UK delivery until June 8, and even then only with American English documentation. British English will take a little longer.

Version 2 of the PC-DOS operating system is not just to support the fixed disc storage. Its extra features allow easier filing

and accessing of data, says IBM, as well as providing back-up and restore commands for the Winchester.

There is upwards compatibility with the current version of PC-DOS, so programs written under PC-DOS 1.1 on an IBM PC will run under PC-DOS 2.0 on a PC or an XT. For all those look-alikes that have jumped on the IBM PC bandwagon there will be a corresponding upgrade of MS-DOS, Microsoft's own-brand incarnation of the operating system.

The minimum self-sufficient XT system, which comes with 128K of RAM, one 320/360 Kbyte floppy drive and a 10 Mbyte Winchester, will set buyers back £4,858.

Dealer reactions to the new machines are generally favourable. "It's not spectacular," says Byteshop marketing manager John Lamb, "but it looks quite a well thought out product. I think it's what people want."

Lamb sees it as part of the classic IBM plug compatible scene: third parties, like Tecmar for which Byteshop's mother company Comart is UK distributor,

have been doing big business with bolt-on Winchester, and IBM wants some of the action itself.

Birmingham-based CPS Data Systems has much the same sort of outlook. "It will not make a major impact on our sales," says commercial manager Nick Ashburner, "since we already sell a lot of Talgrass Technologies hard disc add-ons. IBM is just catching up with what is already out there."

But Ian Dunkley of Datron in Sheffield sees things a bit differently. "Customers are attracted by the IBM name and are wary of putting in large chunks of non-IBM equipment into their PCs. They were worried by the absence of IBM hard discs - the XT is what IBM had to do."

The first school to get an IBM Personal Computer won it in a quiz last week.

Bishop Vesey's School from the West Midlands won the National Computer Education Group Quiz. The school also won the PC with dual disc drives, printer and colour adaptor, and a £100 voucher for Five Ways software.



"Electronic warrants" have stopped hundreds of travellers at frontier posts.

Electronic tourist trap

by Jack Gee
VISITORS to France who fail to pay motorway and other fines risk falling into a trap - arrest by computer - which has been laid by the French authorities for their own citizens as they leave the country.

Branding "electronic warrants", emigration police have stopped hundreds of travellers at frontier posts, including motorways, airports and seaports, over the past few weeks.

Data links between the Treasury and the border posts enables police to identify anybody who owes money to the exchequer.

At Charles de Gaulle Airport in Paris where six terminals are operating, Superintendent Jean Lejeune said: "We can jail people right away if they do not settle their fines. So far nobody has refused to cough up. They prefer to pay rather than argue and miss their plane."

Software has been available for three years allowing Hyperdial to be used with Univac, but the decision to write and adopt its own software for the data marks the company's official stamp of approval on the product.

A nine month delay in the launch of Sperry Univac's 1100/90 series has failed to discourage buyers, says the company. The 190 range was initially scheduled for release this June, but it will now be March 1991 before the first machine sees commercial use.

The official reason given for the delay is "to ensure that the machine will meet the high standards set for it", but Univac spokesmen refuse to reveal just what the problem is.

Univac revamps Cache

by Andrew Thomas
SPERRY Univac has revamped its Cache disc system two years after its launch, with the announcement of a lower-performance, yet a more powerful, Cache system based on the new technology.

The £100,000 Cache system is based on 64K RAM and coupled logic technology. The semiconductor auxiliary storage system (SAS) is basically the cache system without attached disc drives, and is aimed at applications where certain files are accessed repeatedly.

Each SAS subsystem can hold up to 64 Mbytes, and data rate of five Mbytes a second can be achieved. This peak rate can be met with the two disc subsystems, provided the required data is in cache store when requested.

Univac 8450, 8470 and 88 drives can be used with the cache systems, and usable capacity is increased by 60% as a result of the better formatting available.

Deliveries are scheduled to begin in April.

Univac has also announced its intention to develop software to enable NSC's Hyperchannel to be utilised under Series 1100 Executive when attached to a block multiplexer channel. This will enable other Univac or NSC software to control data transfers of up to 10 megabits/second both between 1100 machines and those of other manufacturers.

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NEWS ANALYSIS

Canada pioneers multi-media LAN

Donald Kennett reports from Localnet 83 conference

THE Canadian House of Commons is running a local area network trial designed to lead to a multi-media system providing a wide range of services.

MPs and their staff in nine government buildings in Ottawa will be able to access the services and eventually links are to be set up to their constituency offices.

The project, called Connet, was described last week at Online's Localnet 83 conference and exhibition by Jim Phillips, the senior

adviser for the project managers, the Canadian Broadcasting Corporation.

The trial system covers three floors of one of the buildings, providing electronic mail, shared modem access and Teldion viewdata services to 25 users, as well as FM radio and cable television distribution and closed circuit television coverage of parliamentary debates.

It uses the US-made Sytek Localnet broadband local area network interfaces for data, leaving the bulk of the cable's 400MHz bandwidth to standard audio and video equipment.

But the full-scale system is being designed by broadband network pioneers Mitre Corp and installation will be the subject of a competitive tender in the next few months.

The full network will have four coaxial cables, live and redundant cables to and from the head-end controller, and several bundles of optical fibre cables will be laid at

the same time for future experiments.

Services on the network will include three data channels, capable of supporting 150 simultaneous connections at 19.2 Kbits per second, five television channels for accessing video disc or tape archives, another five for teleconferencing or training, 40 commercial television channels and 100 audio channels for committee reporting and broadcast coverage of debates in the House in two languages.

The data channels will be used initially to link the 100 or so word processors in the building to each other and to outside systems.

Phillips was followed by another Sytek user, Marco Guerra of the Swiss consultancy and turnkey systems supplier Xmit which is installing a network on three sites in Zurich for the University and the engineering technical college.

This system is intended to link 400 computers of various types ranging from Control Data Cyber to micros and allow them to be accessed from 600 terminals. It will also take the load off the private telephone exchange which has been providing modern connections.

Guerra said that the implementation team had considered a broadband network the only possible choice to provide a homogeneous network over the distances involved.

A PABX was impractical in a large project, an X25 network would cause problems with DEC



YEOMANS... Limited understanding of man-machine interface needs.

requirements such as data, video, voice, text and facsimile.

IBM's standardisation work had included the System/360 architecture in the 1960s which had addressed the great number of programming interfaces existing at the time and Systems Network Architecture in the 1970s which had addressed the proliferation of teleprocessing access methods.

The ring-star topology is achieved by having network attachments laid out in a star configuration around wiring concentrators, and daisy-chaining in a logical ring from one attachment to the next. Rings are also connected in a star configuration around bridges - the devices that link rings to each other.

The paper by Ingrid Fromm of Siemens, who is liaison representative between the ECMA and IEEE

LAN groups, described how IBM and Honeywell had opposed the standardisation work on Ethernet until the groups had agreed to split up to handle the different types of LAN proposal separately.

Outlining the history of how ECMA's activities had been a catalyst for progress in IEEE, she said that after the split even IBM had voted for the Ethernet (CSMA/CD) standard. She said ECMA expected to ratify its draft standards for token ring and token bus networks in June and hoped it would be able to exert a similar influence on the IEEE in these areas, since there was still disagreement in IEEE on several functions of the token access method.

However, she added that there seemed to be a difference in the aims of the two groups. ECMA thought it should point the way to further development, while IEEE thought its standards should permit unproblematic fault-free implementation immediately.

John Rance of Racal-Milgo also reported on some of the history of LAN standardisation. He went on to say that it still remained to set up an administration for the global addressing scheme for Ethernet.

Blocks of addresses are still being allocated by Xerox, the original designers of Ethe.net. He also said that further work was needed on broadband media specification and that ECMA activity on a "cheaper net" reduced specification version of the Ethernet CSMA/CD baseband network should be monitored.

John Yeomans of Bosys, a former member of the Department of Industry's Focus project team on LANs, said that the agreement of high level networking standards would be no easier than the agreements on the low levels which had taken several hundred man-years to achieve.

But work on server to server interaction was probably premature, because the requirements of the man-machine interface were so little understood.

Training group code aims to beat 'cowboys'

by John Riley
A FAIR deal for some 100,000 computer trainees each year is promised by a new code of practice for computer training companies issued last week.

The code expects companies to give clients clear information about course content, ability of staff, and terms of business, and is to be followed by the 25 companies belonging to the Education and Training Group of the Computing Services Association, the body that drew it up.

Nick Blakeney-Edwards, chairman of the Group, agreed that it should help to eliminate the cowboys in the business. "This strengthens the standard of the UK data processing training industry", he said. "What people who go on courses run by our

members get for their money will be stated," said Doug Eycions, director-general of the CSA. The Association's member companies train some 100,000 each year.

According to the code, a training company should tell the client the aim of the course, the content and training methods used, and the expected standard of participants.

Students for entry level training should be told details of any financial implications (if, for example, they leave prematurely), who pays the fees, eligibility for the course, training methods and size of classes. The students should also get a syllabus, details of language used, information on how they are to be evaluated, and an opportunity to inspect facilities in advance.

Focom wins business prize

FOUR men who pooled their redundancy pay to form Focom, a Leeds manufacturer of multiplexer systems based on optical fibres, saw their company receive a 1982 Yorkshire and Humberside New Business Award last week.

The award, sponsored by the Association of Yorkshire and Humberside Chambers of Commerce, the Yorkshire Bank and the Yorkshire Post, aims to show that Yorkshire enterprise can defeat the depression. Companies nominated for the award had to be in business for a minimum of two and a maximum of five years.

Focom Systems started in 1980 when four ex-employees of Rank Precision Industries pooled their redundancy cash to form the company. By the end of 1980 Focom was employing 14 people, and now has a staff of 28. Over 50 of its 1600 Series systems have been sold, and its clients include BP and the Ministry of Defence. The company plans further expansion and is making several launches later this Spring.



BYEIONS... New code.

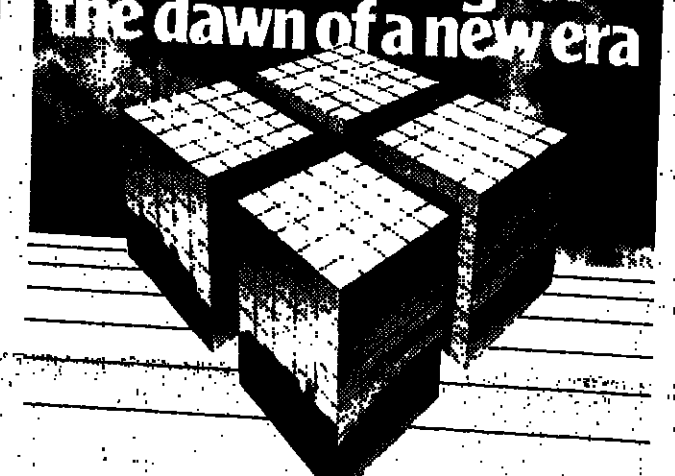
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Ashton-Tate

dBASE II

Codewriter wins market approval

A PROGRAM generator for micros developed in Guernsey is now netting \$250,000 a month from sales in Europe and the US. In its first year on the market the Codewriter, from Dynatech Microsoftware, brought in \$1.6 million.

Managing director Tony Thorne, who took 18 months off work to learn about computers, attributes its early success to his emphasis on investment in positive marketing.

"You should spend at least four times as much on promotion as you do on development," he said. He spent \$700,000 on selling the generator in the first year and expects to put in \$1.2 million this year.

Development of the product, which was carried out by a team of five last year, cost some \$200,000.

It is now available on Commodore and the IBM Personal Computer and next month will be offered on Sirius and Apple micros.

Thorne's company is a subsidiary of Dynatech Corp of Boston, whose main businesses are medical instrumentation and data communications equipment. Thorne was head of the medical division before making the switch into software. His company has sales offices in Guernsey and Chicago and aims to be selling as many as 5,000 Codewriters a month by the end of 1983.

He is following the strategy of aggressive publicity that spelled success for DJ "AT" Systems' generator, The Last One. TLO was funded and heavily advertised by Scotty Bamberg in 1981 for use on Tandy, Apple, Sharp and Commodore machines - leading to com-

plaints to the Advertising Standards Authority over its claim "all the programs you'll ever need". But the Somerset entrepreneur weathered the storm.

In recent years the rivalry in the field has intensified with the entry of the Stemmors of London generator, used with Ashton-Tate's dBase-III, Nucleus from Dorking-based Compact Accounting and the US Computer Pathways Unlimited's Pearl system.

Thorne is also following the serious approach to documentation which helped The Last One, employing outside writers to make it as user-friendly as possible. After a controversial start TLO gained respectability last spring when it was bought by the National Computing Centre. Dynatech will also need to convert the establishment as well as smaller users.

THORNE... Emphasis on promotion to achieve success.

IMS disowns sick pay survey findings

A COMPANY which provided test data for a survey of computerised statutory sick pay systems is now disowning the results.

Information Management Systems of Exeter agreed to supply the data and an independent tester for a survey in this month's edition of *Personnel Executive*. But when the tester, Yolande Smith, withdrew, the magazine went ahead with the survey circulating the subjects with a home-grown questionnaire.

IMS said it thought the magazine had used the data in the wrong way and awarded better results to the participants than were warranted.

But the magazine's editor, Tim Burt, said he was not worried that IMS had disowned the survey. "It's now entirely our effort and if they want to disown it, that's all right by me," he said.

Yolande Smith said she had decided not to take part in the scheme after a "difference of opinion" with IMS.

IMS director Michael Cople-

stone said that some of the computer systems he had looked at fell far short of meeting all the requirements of the new law, which comes into force next month.

IMS has also been dispute with Kalamazoo over its survey of six manual approaches to SSP. Kalamazoo, criticised in the IMS survey of six manual versions, took out a High Court injunction to prevent publication of IMS' findings; but when the order lapsed after two weeks the Birmingham firm decided not to apply for renewal. The firm refused to comment further than observing that the dispute was restricted to manual systems.

IMS is closely involved in the promotion of SSP systems and claims its own manual system is undergoing independent tests at present. It is also linked to Industrial Relations Briefing, which provided the basis for both Computer Management Group's SSP system and Moore-Paragon's MPAIRB manual version.

Hogan stakes future on \$1m bank package

AMERICAN banking software house Hogan Systems has arrived in Britain staking its future on a single package that costs about \$1 million.

The system, which runs on IBM mainframes and compatibles, has already been adopted by 75 US customers since 1979, as well as three in Australia. Now Hogan is testing the temperature of the European water by setting up a company in the City of London.

The Cobol and Assembler product took 100 programmers and analysts to develop and cost more than \$10 million. Vice-president Wade Hanson estimated that 90% of banks and building societies in



HANSON... Banking on software.

Britain already had IBM 4300s or similar hardware. "I guarantee that some of those that don't will be converting or adding that type of machinery to their range," he said.

Today's recipe is in Cobol

THE MENU in Hunting Computer Services latest software package could well be fish and chips.

Last week the company launched a complete industrial catering system written in Cobol to be implemented on Data General machines. Hunting managing director, Bill Chisholm, said: "The package is integrated, from the recipe ingredients and menu design to management reports."

The package costs about £10,000 for those already owning Data General machines, and can be supplied with the hardware, because Hunting is a Data General distributor. The first user is ICI which is using the system in 11 catering establishments in the North-East.

Software File is compiled by George Black

Paper way to stop the micro cheats

A PAPER watermarking system to foil the micro pirates is being developed by Apple II. The Hidden C-Kurity (HCK), as its proprietors call it, which incorporates a paper an ultra-violet light-activated watermark.

The developers say it is easier to see than a traditional watermark and cheaper to produce. The technique was originated for the sorting of letters into first and second class.

Apple is the first computer company to look into the new mode of countering the growing menace of piracy. The micro company has pursued court action in Holland to prevent the distribution of Tandy clones. An order was made in October against the Dutch C&I Trading to stop it marketing the Sunrise Computers of Taiwan. The problem has been greater on the Continent than in the UK. Apple may feel that resorting to litigation is too expensive and partially effective. In the US Courts have been seizing the Apples at the docks and Apple is pursuing a civil case against Formula International, whose Apple kit is said to consist of an Apple II imitation.

German entry

FORMER Zilog central European director Dieter Kadach has been taken on by Digital Research to spearhead its entry into West Germany from April 1. Kadach will lead a team of six selling from Munich to West Germany, Austria, Switzerland and the Netherlands. And the firm plans to show at Hannover Fair. Market strategy is to use major manufacturers as distributors. Kadach said the German market was two years behind but about to take off. A Paris branch is due to open in June.

Vendors' forum

AN INDEPENDENT software vendors' forum is being staged by Digital Research at the Hilton Hotel, London, on April 21. The idea is to clarify recent developments in operating system and enable applications writers to cope with the problems of developing programs for personal computers.

Nordic moves

MICROSOFT, American owner of the MS-DOS operating system, has appointed an exclusive Scandinavian distributor, Svenska Microtech, in a contract valued at more than \$1 million. Microsoft's international director Scott Ohl hopes that the Multiple worksheet will be a big step through Microtech's support. The Swedish distributor handles Apple and Osborne micros as well as Microsoft products.

Positron peach

PEACHTREE, micro software subsidiary of Management Science America, is to put its business management system on Positron machines. The CIS Cobol system consists of a multi-user report control, payroll, order processing and accounting suite. Positron was set up by two ex-IBM men in Lancashire in 1979 to specialise in 16-bit micro-based systems.

SQL update

IBM has updated its 4300-based structured query language SQL to run under SSX/VSE as well as DOS/VSE. A company spokesman said SQL had been simplified for the end-user and was now available to a greater range of people, not just DP professionals. SQL, introduced in February 1981, is a relational database facility.

Software sales soar in the US

SOFTWARE sales in the US are growing at 20% to 22% a year and turnkey systems are increasing their market share, according to a new report.

Software grew to a market of almost \$4 billion in 1981 from only \$210 million in 1967, it says. Predicted expansion is to more than \$8 billion by 1985 and \$23 billion in the mid-1990s.

The rate of progress for software sales is likely to slow from 23% in 1982-83 to 20% in 1983-84.

Turnkey systems, having shot up from \$15 million in the late 1960s to almost \$2 billion in 1981, could account for \$19 billion of sales in 1995.

Computer services including software seem to be developing at a faster pace than computer equipment now. A fivefold growth in the next 12 years is foreseen.

This contrasts sharply with revenue from services running at one-fifth of those from hardware during the late 1960s. Parity between the two segments was reached not long ago and by 1985 services will have outstripped hardware by one-and-a-half times, forging ahead to two-and-a-half times its value by ten years later.

"Computer Services", by Dr Andrew Cross, senior consultant to Prodecra Inc, 11001 Cedar Avenue, Cleveland, Ohio, 44106, USA. Price \$1,095.



Software firms compete to place systems on oil rigs.

SDL gets a foot in the door of oil industry

SYSTEMS Designers of Fleet has moved into the oil industry market by providing microcomputer systems for Shell's Brent Delta platform in the North Sea.

It is SDL's first entry into the field and brings them into fresh competition with such firms as Logica, CAP and Scicon, which are already rivals for government and military business.

The three systems installed on the platform off the Shetlands control water injection pumps which enable Shell to maximise its oil recovery. The dedicated micro-based systems monitor the state of

the pumps, checking oil pressure on the bearings, the temperature of the bearings and vibration levels.

If they go outside set limits, the system generates warning messages and the pumps shut down. The micro can be controlled by an operator plugging in a hand-held VDU and altering the range of signals needed to trip out the pumps. The oil company was looking for a product which could be used in a dangerous environment.

The system is based on the Zilog Z80 processor from the Esso computing subsidiary.

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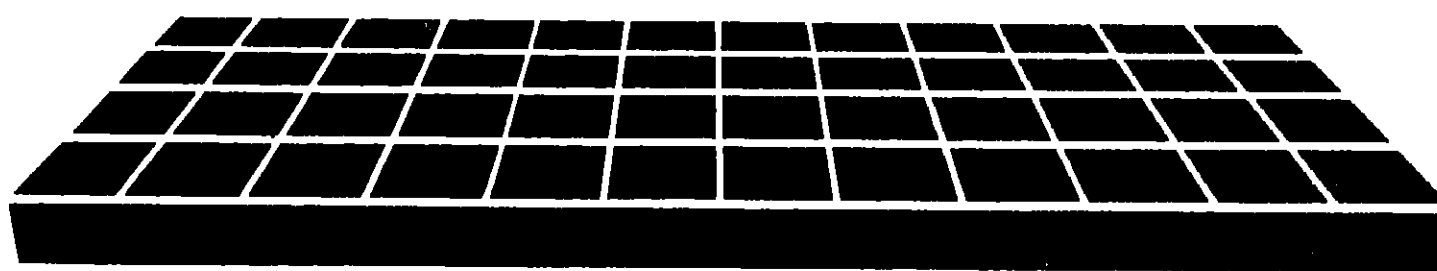
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Burroughs B20 gets graphics

BURROUGHS has updated its B20 microcomputer workstation with high resolution graphics, 15 Mbytes of Winchester storage, and upgrade of the microprocessor in its base system.

The entry level B21 now runs on an 8 MHz 8086 rather than its original 5 MHz 8088, giving an improvement in processor performance of two or three times.

The graphics system comes as an add-on board for the B22 model. It has its own 8086 processor with 128 Kbytes of RAM and offers a set of graphics routines for use with any of the languages supported by the B20 range.

The graphics board allows the user to switch in and out of the graphics facility easily, and it can be linked with the Multiplan financial modelling package so that the move out of graphics mode can be made automatically.

The graphics board, like the B20 workstations themselves, comes from US company Convergent Technologies.



LANG... Reprogrammability is attractive.

Semiconductors may oust floppies

THE RECENT announcement by Intel of the first 256K EEPROM - Electrically Erasable PROM - makes the replacement of floppy disc mass storage by semiconductor memory look feasible. At 256 Kbits, or 32 Kbytes, the devices are large enough to carry a reasonable amount of system or application software in only a few chips. And according to Intel, the move from 64K to 256K EPROMs signals the scaling of key technical hurdles on the way to Mbit and bigger chips.

By redesigning the production process and scaling down the design of earlier parts, making extensive use of wafer stepping lithography, Intel has gone from its 64K 2764, via a 128K part, to the 256K 27256 described at last month's ISSCC in New York.

The complete redesign of the process in that second step makes 512K and one Mbit EPROMs look

look likely in two or three years, with better control over feature dimensions.

The attraction to users of microcomputers incorporating significant amounts of the software in firmware form is essentially one of ease of use and speed. The convenience of fast memory - the Intel 27256 has 200 nanosecond access times - which can be got to by the push of a button, compares well with the bother of floppies.

Putting software into ROM chips is not in itself new, witness the Basic ROMs that appear more frequently in personal computers these days, not to mention the application software ROM cartridges. Intel itself has products carrying the core of its own RMX operating system and of CP/M-86.

It is the reprogrammability of EPROM, coupled with the useful size in bytes, that makes these new devices important.

"As things get more reprogrammable, they become more attractive," says Stewart Lang of Intel Focus. He estimates that about a quarter of a megabyte would make a compiler system for a Cobol environment, and that this would be just part of a whole raft of software people would like to put into ROM of some sort.

Lang sees the appearance of high capacity EPROMs as a key along the way - the reprogramming capability means that software is possible without masking ROMs - but he believes the real advantage will come with high capacity EPROMs, working with the chips still in the development. And there are moves in the field too.

Intel, Seeq Technology and others are close to 64K EPROMs now that only require five pulses to reprogram them.



STROUD... Pushing micros for distributed processing.

Large firms the target for Datapoint micro

WITH its latest offering, the 1560 microcomputer, distributed processing company Datapoint is out to cash in on the boom in small computers for large companies. A 64K 280-based micro running CP/M, with Winchester disc options, the 1560 fits into the mould of many cheaper personal computers, but Datapoint reckons its extras - particularly Arcnet local area network compatibility - will set it apart from the crowd.

"We are not out to compete with the IBMs and Wangs in office automation," says marketing manager John Wells. "Datapoint is strong in distributed data processing rather than office automation, and we see the 1560 as a machine for large companies wanting dispersed data processing for data entry, online order processing and the like."

As well as the Arcnet capability - one feature of the 1560 that its predecessor the 1550 lacked - the machine has an extensive range of communication protocols for mainframe links. These now include IBM SNA, and ICL's CO3 protocol will be added by the summer.

According to Dick Stroud, Datapoint general marketing manager in the UK, the forecast of a major

market for the 1560 in DDP is based on the company's record in that field. Central DP staff in large organisations will have good control of distributed networks, but users at remote sites will find the system easy to use.

Linking 1560s via Arcnet, either to other 1560s or to Datapoint's larger machines, will allow for ready expansion of data processing. Up to 255 processors can be linked on one Arcnet, though separate networks may be linked together to increase this, and share programs and data files.

The 1560 runs Datapoint's own DOS.H operating system as well as CP/M, and networks of mixed operating systems will be possible. In this case there will need to be two file processors - 1560s with attached discs managing requests for disc data from the application processors on Arcnet - one each for DOS.H and CP/M.

Within the general DDP market, Datapoint sees scope for office applications like word processing and financial accounting, provision of CP/M on the 1560 caters for this. As well as acting as a network workstation, the micro can function as a standalone personal computer with up to 40 Mbytes of Winchester storage.

Micro News is compiled by Robert Parry

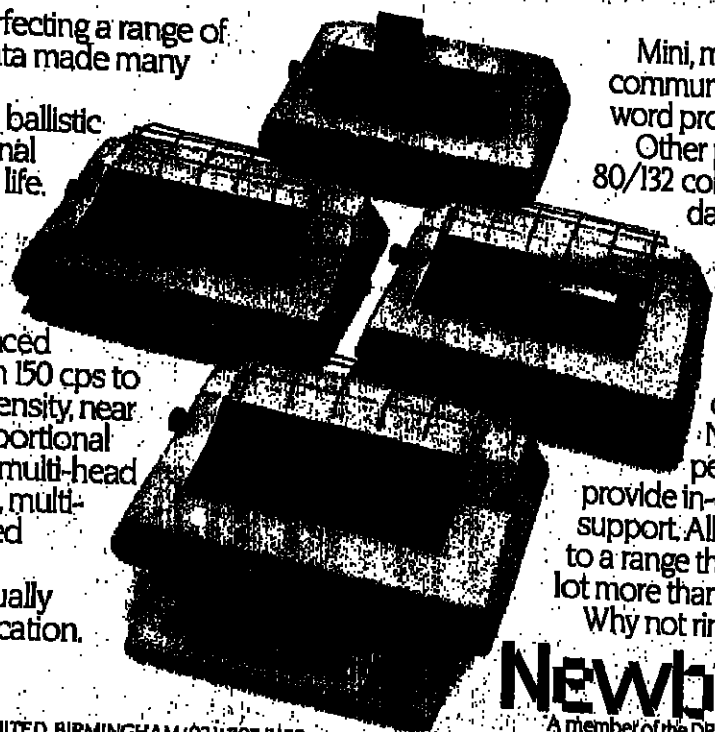
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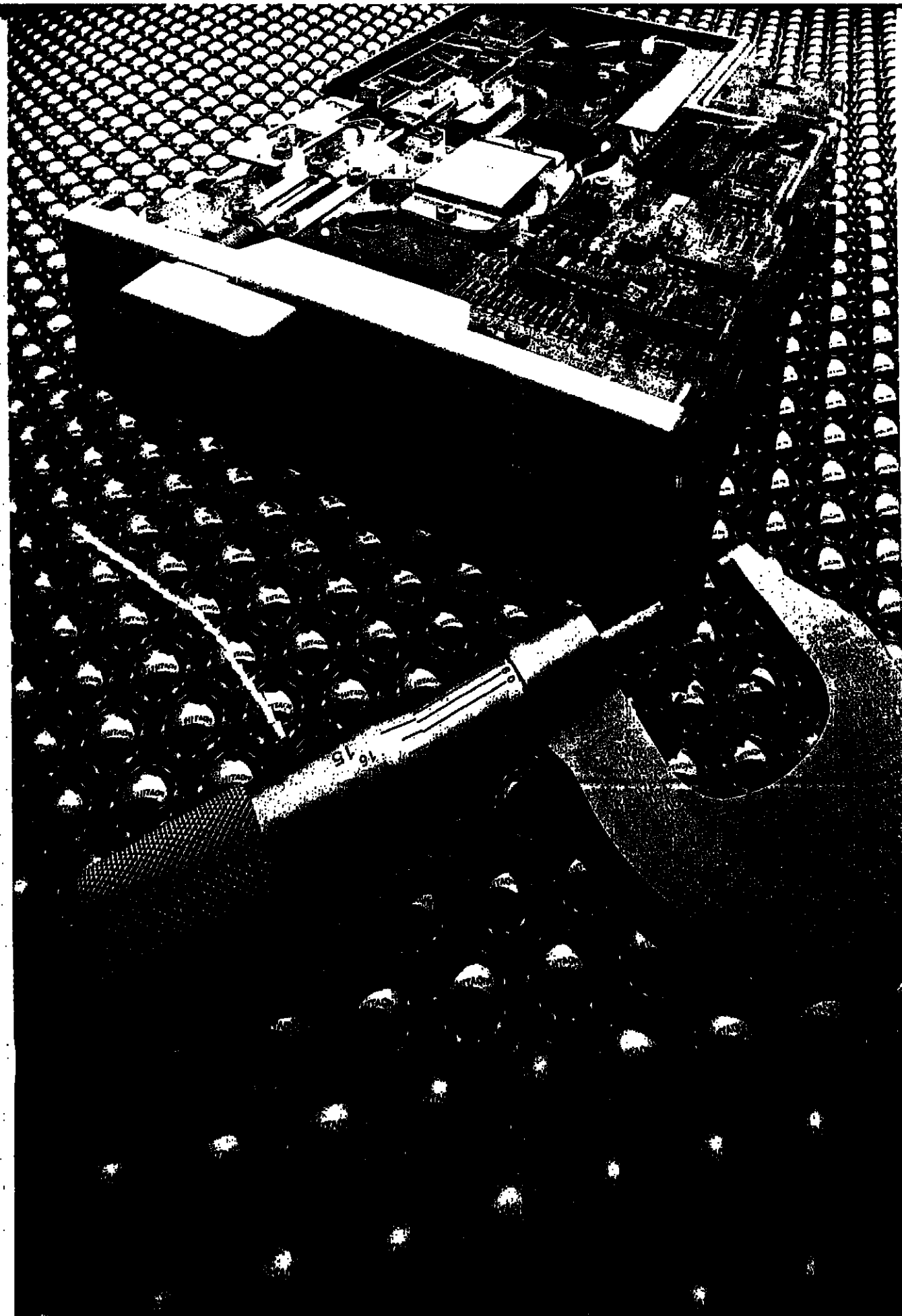
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Company _____
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CW17/2/83

A man who makes 22 years sound more like an epoch

"RIGHT" from the beginning?" A profound sigh. "Christ!" He makes it sound like a ten-thousand year epoch, though it is really only 22 years he is recounted.

"You mean 'in the beginning was the mainframe' and all that? Okay."

Mike Burden is certainly pretending this is going to be just a chore, but he soon fails to keep up that impression. Yes, he's told it plenty of times before, but he doesn't mind reminding, maybe humming it down a little.

"I trained as an accountant, but it wasn't my lifestyle. Creative accountancy? It sounds pretty doubtful. I was a frustrated artist, or musician or writer, so I decided to go into marketing. But marketing what? It had to be something that was taking off. So that meant either planes or earthmoving equipment — they were starting the motorways — or computers."

He wrote to a number of companies before joining Univac as a salesman.

After two years he was offered more by De La Rue Bull — so he went.

"We were taken over three times in the next seven years. I never knew who I was working for. We became General Electric Information Systems; then we were Honeywell Bull."

He began as a salesman, ended there as South-east regional director. Three times he was the firm's salesman of the year.

"I knew everyone in the industry in those days, because there were so few of us. It was Snow White and the Seven Dwarfs. Then came the great expansion and it was suddenly Snow White and the Forty Dwarfs. A lot of those disappeared, but there was another big boom and then it was the 278 dwarfs."

The salesman in the Sixties was mainly an educator, he said. Company managers had no idea that a computer could do their accounts. "They were astonished when you explained it to them." By now he is definitely enjoying it and concedes, "It was a fun time."

Honeywell sent him to Paris for a year. "I had to learn French pretty fast. People kept referring to 'l'ordinateur' and I had to ask what that meant. It was a computer. They hadn't taken on 'le computer' yet."

He was head-hunted by Friden — and Friden then meant calculator in the same way Hoover meant vacuum cleaner. They were making about £500,000 loss on a £5 million turnover, he said.

"The Japanese were bringing in what were then called miniature calculators. I saw all this happen, so I wasn't surprised when it was repeated with micros."

The turn-round of Friden, by then Singer Business Machines, was due to the success of the System 10, the first real time "workstation".

The term was coined by Singer, he said. It took them to around £3 million profit on a £15 million turnover.

In 1971 they gave out a handheld calculator to each of the Pressmen at the Hanover Fair.

"They were absolutely thrilled, can you imagine? We also invented the electronic till, with the help of Sears Roebuck. That was even ahead of NCR."

Singer managers weren't happy when their American masters decided to sell them to ICL.

Why? "You won't get a quote out of me on that one; just say I didn't fancy being a branch of the Civil Service."

From managing director of Singer to managing director of Nibford for England and English-speaking countries. "It was much more formal than working for an American company. It was always Herr Nibford."

There was a brief interlude when he tried to detach himself from the industry and went off to run a pub in Suffolk so that he could see more of his family. But he was enticed back after 18 months to become a consultant to Wordplex, setting up bureaux on a franchise basis.

Then there was a spell on the board of Trident Computer Services, before he moved to his present post heading the new micro house of Optima.



BURDEN... "It's still an exciting business."

feel that I'm getting left behind. Already my teenage son is starting to tell me things I don't understand. But it's still an exciting business because it's the only one that keeps on offering more for less money.

"If cars had moved the same way you'd be able to get a Rolls-Royce for £1.50 by now."

During its controversial life it has been fed with British taxpayers' money, most of which has gone into setting up Immos for manufacturing plant in Colwyn Bay, North Wales.

Only in the last year has the Welsh factory risen from the ground around Newport. Then, almost as the roof was put in place, plans for production were halted through lack of funds. It 3,000 to 4,000 new British jobs, a confidently promised four years ago, were to be a cruel myth.

Inmos — a lame duck or a high flyer?

FIVE years ago this July the then-owned microchip producer Immos was born. It was the creation of politicians. Seldom out of the news, it has enthused some Ministers, such as Labour's Eric Varley and left others, like the Tories' Keith Joseph and Patrick Jenkin, racked with doubt.

The method of its birth was certainly different in style from the way the entrepreneurial companies spring up in Silicon Valley, California. Not one cent of prime venture capital has gone into Immos.

During its controversial life it has been fed with British taxpayers' money, most of which has gone into setting up Immos for manufacturing plant in Colwyn Bay, North Wales.

Computer Weekly

Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS

Thursday, March 17, 1983

Conscripting the computer generation

THE French, who gave us the Nouvelle Cuisine, prove themselves just as imaginative when it comes to developing an approach to computer technology.

In January French intellectual Jean Jacques Servan-Schreiber floated the idea that graduates of the country's colleges and universities could do a stint of "national computer service" as an alternative to the mandatory 12 months in the armed forces. At the time it seemed to us an interesting, if unlikely, idea.

But come March, President Francois Mitterrand actually puts Servan-Schreiber's proposals into action. Instead of taking the call to arms, France's graduates of polytechnics and other "elite" colleges will have the option of training unemployed youngsters in elementary computer technology.

And in a move that could be cheered by the stalwarts of the peace movement, Mitterrand immediately mobilised 12,000 graduates from 110 institutions of higher education to give the computer courses.

Mitterrand's motivation in pushing the plan forward is his fear that France is falling behind in its race to catch up with Japan in information technology by the end of the decade.

It is too early to tell whether computer conscription will have the desired effect. The training courses for unemployed people between 15 and 25 years of age will last only one or two months, which hardly seems long enough to inculcate them with state of the art technology.

And conscription is conscription, no matter how attractive one makes it. Will France's computer recruits have the motivation to make the programme work?

No price tag has yet been put on the scheme, and the implications for employment are not clear. But one has to be impressed by the speed with which Mitterrand took the challenge and turned it into action.

We know there are as many problems on the French side of the channel as there are on the British side. But one also is left with the impression that, at least when it comes to the computing industry, the French recognise that something out of the ordinary is needed.

The debate on how to exploit information technology continues to rage in the UK. When the government finally unveils a programme for the future let us hope it has understood that both imagination and speed are essential if the UK is not to be among the also-rans.

Bull's-eye for IBM

WHATEVER you think of IBM you have to admit that the market leader has got things exactly right with the launch of the 3725 communications controller.

IBM's competitors are stifling yawns, saying the product merely offers more of the same: it is just an updated version of the ancient 3705 with more memory, more lines and — at last — a console. This only brings IBM's product up to the standard set by competitive products for several years, they say. Even so, it still leaves much of the onus of network control firmly with the mainframe.

What is more, IBM users agree. The difference is that this is all they were waiting for. They did not want to have to reconfigure their networks around a new IBM philosophy. The very fact that the 3725 is more of the same, with knobs on, is its attraction for users.

While IBM has got it right as far as its users are concerned, it has also hit the bullseye in terms of its own interests. For it is in IBM's commercial interest to tie users as tightly as possible to its mainframes and operating systems. Putting more network control into the communications processor merely gives other companies the chance to offer bigger and bigger communications processors handling more and more of the functions which the IBM mainframe would normally control.

Clearly IBM knew just what the users wanted, this time. And this time it was able to give it to them, because fortunately what was good for users was also good for IBM.

1984 and all that...

THIS week's example of the strange things people say about computers was sent in by Nik Morton of Fareham, Hants, who wins £5.

We live at the beck and call of the computer and its human equivalent, the VAT-man.

LETTERS

College co-operation

WITH reference to the article on training for computer service engineers (CW, March 3), may I put the record straight regarding Slough College's involvement?

We have been running one-year full-time courses for computer service engineers since January 1980.

The course was designed originally with representatives from CTL, Data General, DEC, Hewlett-Packard and Prime, and leads to a TEC Higher Certificate in Computer Technology. The courses are supported by the MSC under the TEC scheme and include industrial training at computer manufacturers' and users' premises during the Easter and summer vacations.

The course has been updated to include work on microprocessor-based control systems and interfacing. This has made it applicable to a wider range of companies which co-operate with us by providing industrial training and permanent employment at the end of the course.

Recently, Slough College was selected by the government as one of 16 polytechnics and colleges of higher education to increase the provision of information technology courses at the advanced level.

We have been asked to increase the intake to our BEC/TEC Higher National Diploma course in Computer Studies to 100 students, and to offer a new two-year full-time TEC Higher Diploma course in Computer Technology from September 1983.

We are grateful to the many firms which have supported us by providing industrial training places for our students.

We are always keen to hear from companies which would like to co-operate with us, and for which we hold regular meetings at Slough College. We would be pleased to discuss areas of co-operation across a wide spectrum of information technology training — computer technology, including control systems and real time programming, commercial programming and systems analysis, office systems. We have specialist lecturers in all these subjects.

I can be contacted on Slough 34585.

Head of Computing Division
Slough College of Higher Education.

Dr EVA HUZAN

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Updated list of factors

WITH reference to the letter from M. R. Mudge (CW, February 10) I enclose an updated list of factors of repunits. The work was done by Steve Thomas and Paul Leyland, using several microprocessors for long periods. Their factorisations of 1_n are complete for all small n , except $n = 45, 53, 59, 61, 65, 69$, etc. In most such cases the smallest unknown factor is larger than 4.10^9 .

The factorisation of such large numbers is likely to take too long to be used as a benchmark for general arithmetic packages.

Hatfield Herts.

GRAEME THOMAS

Factorisations of 1_n for small n

n	Factors
2	3, 7
3	3, 7, 11, 13, 37
4	3, 7, 11, 13, 37
5	3, 7, 11, 13, 37, 41, 101, 137, 588, 2353
6	3, 7, 11, 13, 37, 41, 101, 137, 588, 2353, 333667
7	3, 7, 11, 13, 37, 41, 101, 137, 588, 2353, 333667, 111, 23, 4093, 8779, 248, 513239
8	3, 7, 11, 13, 37, 41, 101, 137, 588, 2353, 333667, 111, 23, 4093, 8779, 248, 513239, 29, 28
9	3, 7, 11, 13, 37, 41, 101, 137, 588, 2353, 333667, 111, 23, 4093, 8779, 248, 513239, 29, 28, 31, 37, 41, 271, 290611
10	3, 7, 11, 13, 37, 41, 101, 137, 588, 2353, 333667, 111, 23, 4093, 8779, 248, 513239, 29, 28, 31, 37, 41, 271, 290611, 37, 3
11	3, 7, 11, 13, 37, 41, 101, 137, 588, 2353, 333667, 111, 23, 4093, 8779, 248, 513239, 29, 28, 31, 37, 41, 271, 290611, 37, 3, 41, 271
12	3, 7, 11, 13, 37, 41, 101, 137, 588, 2353, 333667, 111, 23, 4093, 8779, 248, 513239, 29, 28, 31, 37, 41, 271, 290611, 37, 3, 41, 271, 43, 21
13	3, 7, 11, 13, 37, 41, 101, 137, 588, 2353, 333667, 111, 23, 4093, 8779, 248, 513239, 29, 28, 31, 37, 41, 271, 290611, 37, 3, 41, 271, 43, 21, 47, 46
14	3, 7, 11, 13, 37, 41, 101, 137, 588, 2353, 333667, 111, 23, 4093, 8779, 248, 513239, 29, 28, 31, 37, 41, 271, 290611, 37, 3, 41, 271, 43, 21, 47, 46, 53, 13
15	3, 7, 11, 13, 37, 41, 101, 137, 588, 2353, 333667, 111, 23, 4093, 8779, 248, 513239, 29, 28, 31, 37, 41, 271, 290611, 37, 3, 41, 271, 43, 21, 47, 46, 53, 13, 59, 58
16	3, 7, 11, 13, 37, 41, 101, 137, 588, 2353, 333667, 111, 23, 4093, 8779, 248, 513239, 29, 28, 31, 37, 41, 271, 290611, 37, 3, 41, 271, 43, 21, 47, 46, 53, 13, 59, 58, 61, 60
17	3, 7, 11, 13, 37, 41, 101, 137, 588, 2353, 333667, 111, 23, 4093, 8779, 248, 513239, 29, 28, 31, 37, 41, 271, 290611, 37, 3, 41, 271, 43, 21, 47, 46, 53, 13, 59, 58, 61, 60, 67, 33
18	3, 7, 11, 13, 37, 41, 101, 137, 588, 2353, 333667, 111, 23, 4093, 8779, 248, 513239, 29, 28, 31, 37, 41, 271, 290611, 37, 3, 41, 271, 43, 21, 47, 46, 53, 13, 59, 58, 61, 60, 67, 33, 71, 35
19	3, 7, 11, 13, 37, 41, 101, 137, 588, 2353, 333667, 111, 23, 4093, 8779, 248, 513239, 29, 28, 31, 37, 41, 271, 290611, 37, 3, 41, 271, 43, 21, 47, 46, 53, 13, 59, 58, 61, 60, 67, 33, 71, 35, 73, 8
20	3, 7, 11, 13, 37, 41, 101, 137, 588, 2353, 333667, 111, 23, 4093, 8779, 248, 513239, 29, 28, 31, 37, 41, 271, 290611, 37, 3, 41, 271, 43, 21, 47, 46, 53, 13, 59, 58, 61, 60, 67, 33, 71, 35, 73, 8, 79, 13
21	3, 7, 11, 13, 37, 41, 101, 137, 588, 2353, 333667, 111, 23, 4093, 8779, 248, 513239, 29, 28, 31, 37, 41, 271, 290611, 37, 3, 41, 271, 43, 21, 47, 46, 53, 13, 59, 58, 61, 60, 67, 33, 71, 35, 73, 8, 79, 13, 83, 41
22	3, 7, 11, 13, 37, 41, 101, 137, 588, 2353, 333667, 111, 23, 4093, 8779, 248, 513239, 29, 28, 31, 37, 41, 271, 290611, 37, 3, 41, 271, 43, 21, 47, 46, 53, 13, 59, 58, 61, 60, 67, 33, 71, 35, 73, 8, 79, 13, 83, 41, 89, 44
23	3, 7, 11, 13, 37, 41, 101, 137, 588, 2353, 333667, 111, 23, 4093, 8779, 248, 513239, 29, 28, 31, 37, 41, 271, 290611, 37, 3, 41, 271, 43, 21, 47, 46, 53, 13, 59, 58, 61, 60, 67, 33, 71, 35, 73, 8, 79, 13, 83, 41, 89, 44, 97, 96
24	3, 7, 11, 13, 37, 41, 101, 137, 588, 2353, 333667, 111, 23, 4093, 8779, 248, 513239, 29, 28, 31, 37, 41, 271, 290611, 37, 3, 41, 271, 43, 21, 47, 46, 53, 13, 59, 58, 61, 60, 67, 33, 71, 35, 73, 8, 79, 13, 83, 41, 89, 44, 97, 96, 99, 98
25	3, 7, 11, 13, 37, 41, 101, 137, 588, 2353, 333667, 111, 23, 4093, 8779, 248, 513239, 29, 28, 31, 37, 41, 271, 290611, 37, 3, 41, 271, 43, 21, 47, 46, 53, 13, 59, 58, 61, 60, 67, 33, 71, 35, 73, 8, 79, 13, 83, 41, 89, 44, 97, 96, 99, 98, 101, 4
26	3, 7, 11, 13, 37, 41, 101, 137, 588, 2353, 333667, 111, 23, 4093, 8779, 248, 513239, 29, 28, 31, 37, 41, 271, 290611, 37, 3, 41, 271, 43, 21, 47, 46, 53, 13, 59, 58, 61, 60, 67, 33, 71, 35, 73, 8, 79, 13, 83, 41, 89, 44, 97, 96, 99, 98, 101, 4, 103, 34
27	3, 7, 11, 13, 37, 41, 101, 137, 588, 2353, 333667, 111, 23, 4093, 8779, 248, 513239, 29, 28, 31, 37, 41, 271, 290611, 37, 3, 41, 271, 43, 21, 47, 46, 53, 13, 59, 58, 61, 60, 67, 33, 71, 35, 73, 8, 79, 13, 83, 41, 89, 44, 97, 96, 99, 98, 101, 4, 103, 34, 107, 53
28	3, 7, 11, 13, 37, 41, 101, 137, 588, 2353, 333667, 111, 23, 4093, 8779, 248, 513239, 29, 28, 31, 37, 41, 271, 290611, 37, 3, 41, 271, 43, 21, 47, 46, 53, 13, 59, 58, 61, 60, 67, 33, 71, 35, 73, 8, 79, 13, 83, 41, 89, 44, 97, 96, 99, 98, 101, 4, 103, 34, 107, 53, 109, 108
29	3, 7, 11, 13, 37, 41, 101, 137, 588, 2353, 333667, 111, 23, 4093, 8779, 248, 513239, 29, 28, 31, 37, 41, 271, 290611, 37, 3, 41, 271, 43, 21, 47, 46, 53, 13, 59, 58, 61, 60, 67, 33, 71, 35, 73, 8, 79, 13, 83, 41, 89, 44, 97, 96, 99, 98, 101, 4, 103, 34, 107, 53, 109, 108, 333667, 70541929, 1417596169, 99999900001, 440334654777631, (29 digit number)

It's an upside down world

I READ with interest the article on CAD North (CW, February 24) and was "drawn" to the caption at the bottom which states "... resulting in a final product which matches requirements exactly."

Sadly, it does not; exactly someone had the plans upside down and while placing the trunking on the floor also had the idea of suspending the scaffolding from the ceiling or the photograph is upside down.

Personally, based on my years in DP, I suspect the former.

BERNARD WEEKES

Mercantile and General Reinsurance Company Cheltenham.

Dr F. J. WRIGHT

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LOCAL AREA NETWORKS

SIA adds weight to the 'buy now' LAN lobby

Tom Ivall reports on a service bureau's experience with a local area network

ARGUMENTS for and against local area networks have raged back and forth in the computing arena for years. Manufacturers have pressed the case for acceptance of their wares while many consultants and industry specialists have urged caution. "Let the buyer beware" seems to be their message.

One firm that has gone in for a local area network without worrying too much about international standardisation or a possible shake-out of systems is SIA Computer Services, a computer service bureau. And it looks like the SIA experience will add fuel to the cause of the "buy now" lobby.

Part of an international service organisation, the French CISI Group, SIA had the problem of how to accommodate electrically the increasing number of clients wanting to make use of their computers for timesharing and batch processing work.

At the company's Ebury Gate, London, headquarters there are three large mainframe machines, and clients have access to these through telecommunication links from centres in 12 UK towns and two Continental cities (Paris and Rotterdam). In addition there are telecommunication links with CISI's bureau computers at Saeley, user Paris, and with access points in 28 countries, in Europe, North America and other parts of the world.

Also linked into this network are the Los Angeles and Philadelphia computer centres of two American subsidiaries of CISI, known as the CISI network Corporation.

Apart from these remote access centres, SIA provides facilities for clients in South-east England to bring batch processing jobs directly into the London computer centre, to be done "over the counter". Terminals of various types are laid out in a large "client area", rather like an open-plan office, on the first floor of the building, and it is quite usual to see a dozen or so customers working here at the same time.

Other terminals at Ebury Gate are installed in demonstration and

connected network", each piece of equipment being connected to another unit with which it needs to communicate by a unique, dedicated circuit.

In practice this meant that the network was built up with four-wire circuits (go and return channels) grouped into 48-core cables. The system was extremely cumbersome - expensive to install and complicated to operate and maintain - and inflexible. Every addition or modification required fresh wiring around this building.

It was clear to the communications manager that future network expansion was feasible only with some form of common medium shared by the equipment on a time basis

training rooms, staff offices and equipment areas distributed throughout the building on five floors. Altogether the terminals are quite a mixture - 25 different types from 17 manufacturers, some synchronous but the majority asynchronous.

As its bureau business expanded, SIA began to find serious difficulty in coping with all the connections now needed for interworking between the local, national and international access points and the computer centres in London and abroad. The network proliferated as new circuits were put in on an ad-hoc basis.

It therefore developed on the electrical principle of the "fully-

shared common medium in the SIA system is a ring of inexpensive coaxial cable with a length of 709 metres. This passes round the various rooms and technical areas in a plastic covered duct at skirting-board level, going from floor to floor through ducts in the lift shafts. (Actually there are two such coaxial cables running together, for a reason to be explained).

All items of equipment - computers, terminals, printers, remote access links, etc - are connected to this cable at cable access points (CAPs) installed at convenient positions on the ducting along the whole length of the run. These connection points are junction boxes, containing passive electronic switches, and are the same size as a domestic mains power socket.

From each CAP a cable runs via a 15-way connector to an interfacing unit, called a terminal access point (TAP). This is about the size of a small audio cassette recorder and is placed on a desk or shelf near the terminal or other equipment or beneath a telephone. Each TAP provides two V.24 interface connections and typically these serve a terminal and a printer, allowing data rates up to 19.2 Kbit/s.

In the computer room, several TAPs are used for interfacing the mainframe machine ports to the ring (eg four for an IBM 3032). Also from here, some of the V.24 links out of the building to SIA's remote access points in the UK and other countries.

Within the computer room the coaxial cable ring also passes, via a CAP, through the network's controller, a unit called the Director. Essentially a microprocessor-

of course, between the manufacturers who are offering competing products based on these different options.

The problem of choice was also complicated for SIA by the current attempts being made to arrive at standards for local area networks. For worldwide standards the International Standards Organisation (ISO) is nominally responsible. But, apart from its work in defining an open systems reference model for universal communication between DP systems, it is largely following behind and attempting to co-ordinate the activities of other bodies.

The really effective standardisation work, being done for example by the European Computer Manufacturers' Association (ECMA) and the Institution of Electrical and Electronic Engineers (IREE), is still rather limited and specialised. So there is still a long way to go.

These uncertainties - and the feeling that things like video, digital FAXes and public integrated services digital networks will influence LAN technology - have made many potential users unwilling to commit themselves to a particular LAN system. They are just waiting to see what happens. For SIA, however, the need for a common, shared interconnection system was too pressing to allow a lengthy appraisal.

Some earlier business and engineering contacts with Racal-Milgo gave SIA the opportunity to discover the LAN system then being developed by that company and realise that it would meet its computer time-sharing needs. As a result the Racal-Milgo product, a ring system called Planet (Private Local Area Network), was installed at the Ebury Gate headquarters in March 1982 and is now celebrating a successful first year of operation.

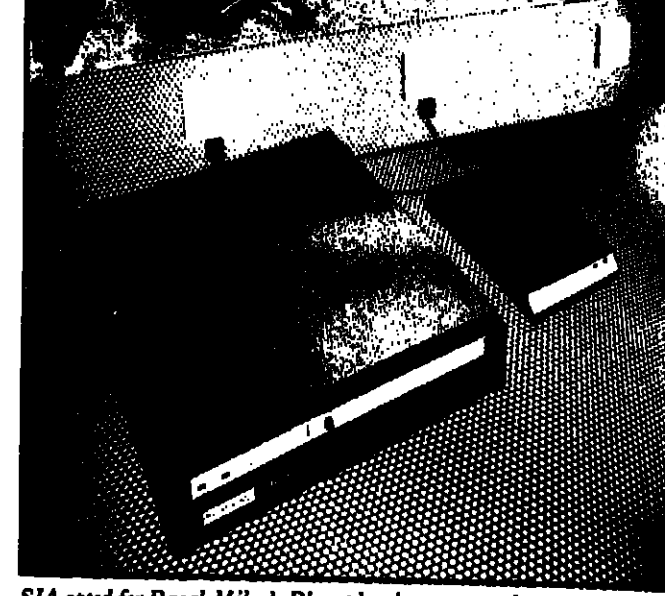
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SIA opted for Racal-Milgo's Planet local area network.

controlled database, it stores information in a RAM about current connections throughout the system and is used to set up and control the data paths.

All this information is available through a local terminal and/or printer, and also at any other designated terminals in the ring.

The general principle of the Planet ring is that every unit connected to the ring "broadcasts" its output, but this information is only acted upon by the particular unit to which it is addressed. The information is carried by a baseband signal, circulated through the cable as a clocked serial data stream which is divided into 42-bit packets.

Each packet contains the address of the unit to which it is being sent (specifying which of the two TAP ports), and 16 bits of data. It also contains a number of control bits for operating the system.

In the formal classification of local area networks the Racal-Milgo system is a token-passing slotted ring. Several packets are circulating all the time in the cable, some of them carrying information and some unused.

Each packet contains, as an initial control bit, a "token" bit, which indicates whether it is occupied or unused. A particular TAP, holding data addressed to another TAP, recognises a free packet by the 0 or 1 state of its token bit, loads 16 bits of data into it, adds the destination address and sets the token bit.

The now occupied packet continues round the ring, passing through each TAP, including the one to which it has been addressed. Here, after marching the addresses, the TAP reads but does not remove the 16 bits of data. It also sets an acknowledgment bit to indicate that the data has been read. When the packet returns to its source TAP the token bit is reset and the now free packet passes on for use elsewhere.

Because, in this arrangement, the token must always be released, no TAP can monopolise the network and thereby deprive other TAPs of service. As a result a response time can be guaranteed and the performance is maintained up to the maximum capacity of the network. Because the digital information circulates so fast (at the propagation velocity of pulses in a transmission line) and the data rate is so much higher than is needed by the terminals, the network appears to provide a continuous connection for anyone operating a terminal.

As far as SIA's clients are concerned, this means that a circuit going through the LAN is "transparent" and independent of

protocol. SIA uses this means of transmission and distribution in a number of different ways. One method provides a virtually permanent connection between a dedicated terminal and its associated port on one of the mainframe computers. These "permanent" circuits are set up by SIA staff entering plain language commands into the Planet Director via any terminal. Another method provides switched circuits.

Since any of the mainframe machines might in fact be suitable for a given client at a particular terminal, a further facility provided is "hotswap hunting" to find an available computer port.

Another method used by SIA is equivalent to the transfer of a telephone call. A "call" taking place between one terminal and a computer port can be transferred to another terminal, leaving the first one free to select a different service, and calls can be set up between two third parties.

Finally, SIA has arranged for subsidiary short rings to be connected in place of conventional equipment. These can be used in the same fashion as the main Planet ring.

When a TAP is first connected to a CAP its presence is automatically detected by the Director. SIA can select, from a menu presented on a terminal screen, the characteristics to be assigned to the TAP interface ports. These are then automatically loaded, via the ring, into a memory in the TAP.

If SIA staff have to move a terminal and its associated TAP from one room to another, they only have to unplug it from the CAP plug it into the new CAP and carry on as before. The TAP address goes with it.

One of the important features of the Racal-Milgo local area network which particularly commended itself to SIA is a built-in fail-safe system. This detects breakdown in the ring and automatically restores service.

As mentioned above, the physical medium consists of two coaxial cables running side by side. Both cables running side by side, of these pass through all the CAPs. Inside the Director at the ends of the cables are connected in such a way that the whole ring becomes a folded loop. If the cable is severed at any point, or a CAP or a TAP fails, this situation is automatically detected by the LAN Director.

The two ends of the folded loop normally have a "gap" between them, inside the controller. But on detection of the fault, the Director automatically moves this "gap" from within itself to the point where the fault has occurred.

Since this means that the folded loop is no longer broken, but its "gap" just moved to another place, the LAN service is restored.

SITE VISIT

Royal bank takes different line in the power game

Scotland holds fire on the 3081... Kevan Pearson reports

WHILE the big four clearing banks are throwing processing power at the problem of providing higher levels of computer-based services at branch level, one Scottish bank is taking a different approach.

The big four in England, with the exception of the Midland, have all ordered and taken delivery of multiple IBM 3081 mainframes. But the Royal Bank of Scotland sat firmly on its cheque book and waited.

Only now, over two years after IBM announced the now obsolete 3081D, is the RBS beginning to take delivery of the systems which will take it into the 1990s. And much to IBM's annoyance, though nonetheless evident chagrin, it does not include a clutch of multiple 3081s - not for the next three or four years, anyway.

But one piece of kit will be essential to the effort RBS is putting into providing a better, more comprehensive and reliable service in its branches, says Alan Knight, who is in charge of capacity planning at RBS. And that is Network Systems' Hyperchannel with its associated software.

Hyperchannel is a high speed coaxial cable-based network system which is capable of data rates of 200 Mbit/s a second over 1.5 kilometres. Although RBS will

this further with Hyperchannel and its device connect facility.

"The big problem today," he continues, "is configuring an installation. You can buy the capacity you need, that's the easy part. But the number of switches you need in a complex installation to provide full back-up is positively ludicrous."

The first thing Hyperchannel will be used for is to transfer data which is not on disc between the two sites under its Bulk File Transfer routine. "The only way we can do this at the moment is a slow TP line or a dump to tape and then physically carry it down. It can be very time consuming to transfer a lot of small data sets by these methods," says Knight.

The second major application will be to use Netex for applications program communications "to provide a totally machine transparent service to users".

In the longer term the bank plans to link devices like 3270 screens to Hyperchannel, and it even plans to have a link to Williams and Glyns in London. Both are part of the same banking group. Hyperchannel will not stretch from Edinburgh to London, but British Telecom's Megastream will, and so could the Mercury fibre optic network.

One of the major benefits Knight sees from the system is the high security back-up which should be available when the system is fully installed. Like its competitors RBS is providing much more computer power to the branches in the shape of automatic teller machines and branch systems. But in Knight's view this does not necessarily mean that the central DP site shrinks.

"At the end of the day you have to come back to the central site," he says. "You've got to have reliable back-up and availability at the centre."

The decision to buy Hyperchannel was not that easy, though, despite the fact that only Network Systems provides this kind of product with connection facilities for just about every main and mainframe manufacturer.

"One of the things I had to think long and hard about with Hyperchannel was whether IBM would come along with its own version. I came to the conclusion it wouldn't, because the money it could make from such a move would be very small comparatively," says Knight. He adds that most of the moves IBM seems to be making these days point to standard systems for standard problems, with the market for a Hyperchannel type device far too limited for IBM. And in any case IBM is one of NCS' largest customers, with no fewer than six Hyperchannels working at US sites.

IBM is not losing out in the RBS race to provide this level of service though. Knight says the bank has two 3083Js on order, which will replace the 1584s, and which will be upgraded ultimately to 3081 specification, or whatever is around at the time.

The bank did not order a clutch of 3081Ds when the machine was announced despite the appearance of the IBM salesman with most completed contracts. It had been rather stung over a 370/155, in the days before Knight joined.

"There was no way that this was 370 - it did not even have micro code," he says. "Then there was

the 3032. So with the 3081 we waited for the one we really wanted, which proved to be the 3083J".

And a move from MVS/SP 1.3 to MVS/XA is planned within the next three years.

But the problem with IBM is that it is more of a marketing organisation than a front line technology company. Knight explains, "IBM produces faster and faster computers, but do they do what you really want? The answer is no - but they do what you don't want much faster".

The introduction of the new Statutory Sick Pay legislation is going to create enormous problems for Data Processing Managers. And those problems are going to fall right in those areas that are old favourites of DPM's everywhere, payroll and personnel.

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Knight... "The number of switches you need in a complex installation is positively ludicrous".

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our already proven Unipersonnel package, it's on-line and user-controlled, and interfaces not only with Unipay (our own payroll package), but with any other software you may be operating.

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In addition, we've produced a comprehensive video training package, which provides not only a full analysis of the workings and implications of SSP, but a clearly detailed model computer solution. This unique video package is available only from Peterborough Software and provides an invaluable teaching and reference tool for payroll, personnel and DP staff at all levels. Given the problems that SSP could give you, it represents superb value at \$750 plus VAT.

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COMPEC WALES PREVIEW

A welcome in the hillsides

Wales is a valuable if unusual market. John Kavanagh reviews the exhibitors which are hoping to profit from it

SOUTH Wales is a "very peculiar" market in which small companies in particular are suspicious of computing and can take a year to decide whether to buy a microcomputer. Yet at the other end of the scale big national companies, attracted by development agencies, are bringing good business to specialist local firms and to large suppliers with offices in South Wales and South-west England.

These are the views of companies exhibiting at *Computer Weekly's* first Compec Wales show, which runs from March 22 to 24 at University College in the heart of Cardiff.

The "peculiar" nature of the market is shown by the variety of companies on show. They range from local microcomputer dealers to big names such as Hewlett-Packard, Systime and Case. They have pointed to a clear need for Compec Wales.

"There have been several business shows but they are too broad-based," said Brian Gardner at the Cardiff microcomputer systems house Canopus Computer Systems. "An exhibition dedicated to computing is a good idea."

It was Gardner who described the local market as "very peculiar". "It's extremely patchy, in that interest comes and goes," he said. "A supplier might have to go to an established small or medium-sized business for a solid year before getting an order. In an area like South Wales there's a fear that if you put in a computer someone's going to be made redundant."

COMPEC WALES runs from Tuesday, March 22 to Thursday, March 24. It is open from 10am to 6pm on Tuesday and Wednesday and 10am to 4.30 on the Thursday.

The show is at University College, Cardiff in the centre of the city. Tickets cost £2 at the door.

There is ample parking both on the campus and in surrounding streets. A large restaurant offering main courses such as steaks and fish at reasonable prices is also on the campus.

Canopus is showing eight- and 16-bit microcomputers from the US company Altos and from Digital Microsystems, the US firm now owned by the UK Eitel group. Canopus software includes packages from Peachtree, which has made its mark with agreements with the likes of IBM and Digital Equipment.

Single microcomputers and networks are offered by Canopus. Digital Microsystems claims to have 1,000 local area networks installed around the world, including 200 in the UK. Its Hi-net network can support 32 CP/M devices.

Altos offers the great rival to CP/M as operating system of the future - Unix. The 16-bit ACS 8600 runs Microsoft's Xenix version of Unix, plus CP/M.

The Altos range is also offered by Brindley Microcomputers, another local systems house.

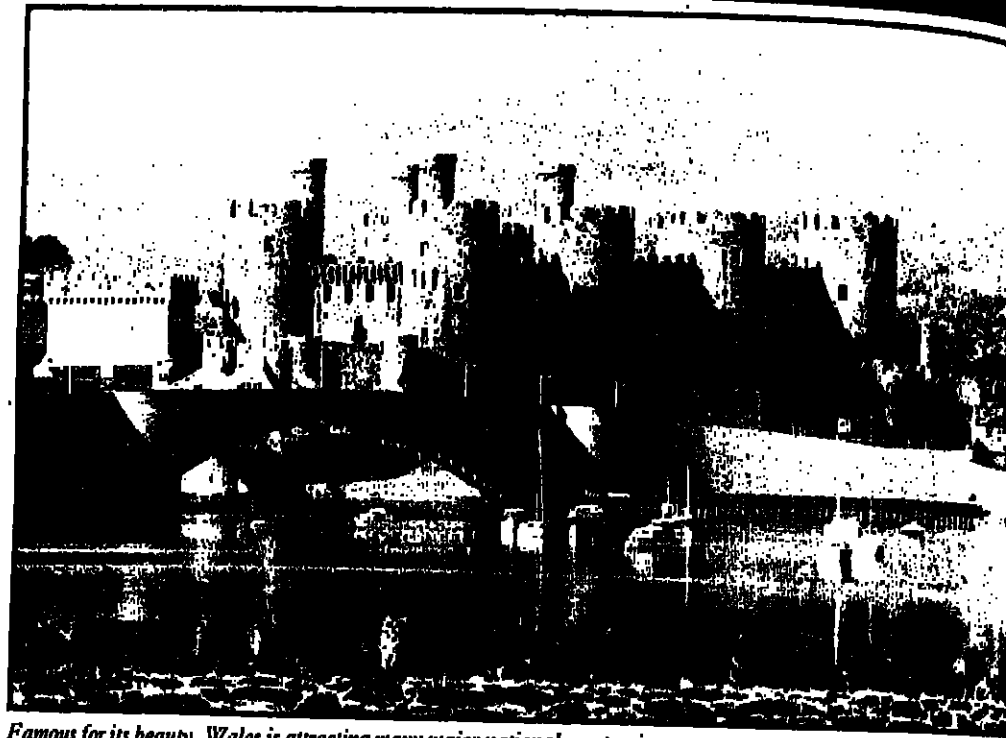
Sigma Systems of Cardiff has pulled off a coup by becoming the only authorised distributor in Wales for the IBM new Personal Computer and the Digital Equipment microcomputer range.

Compec Wales will be the first public showing in Wales for the IBM microcomputer. The 16-bit machine can grow from 64K of user memory to 544K. The system includes a speaker for audio applications and one or two floppy disc drives.

Software includes a 16K Basic interpreter and an operating system developed with Microsoft. Established products such as Peachtree's applications packages are available.

The DEC range from Sigma involves the Rainbow 100, which has both Zilog and Intel chips to provide eight- and 16-bit processing; the DECmate II, based on the DECmate word processor and running DEC's operating system and high-level Dilog language or CP/M; plus the Professional family, based on DEC's PDP-11/23 computer and running a real-time operating system.

Sigma's other main exhibit will be the Commodore 700 range of Business microcomputers - but it will be challenged by Commodore supplier Reeves Computers, claimed to be the biggest name in



Famous for its beauty, Wales is attracting many major national companies.

microcomputers in South and West Wales. It has over 350 installations.

Another South Wales firm, Computer Practice, is showing its two contrasting specialties - controllers for machine tools and systems for the Press, such as packages for Press agencies, printers and editorial offices. They are based on the Alpha Micro computer, which the company distributes in the area.

Swansea retailer and systems house Bucon is showing the Torch microcomputer, made by the UK firm in North Wales. It runs a CP/M lookalike operating system.

Steve's Computer Company is the South Wales distributor for the Dragon microcomputer and the Epson HX20, a portable Japanese machine which took the main Compec show by storm in November. The HX20 has a built-in printer and display, a 50,000-character tape, communications and Basic in a small, light package. Software includes order processing for the sales person on the road, word processing, office diary and mailing list systems.

These local firms are battling it out at Compec Wales with the likes of Hewlett-Packard and Research Machines.

Research Machines is well into microcomputer networking with Zilog's Z-Net. Last year the UK firm added the 480Z to its established 380Z specifically as a network workstation. The eight-bit machine is a cassette-based system. Like the 380Z, it is aimed at the schools market but the company pointed out that the colour graphics and communications facilities of the 380Z, plus the availability of established packages such as Wordstar for word processing and Gino for design applications, has taken the machines into the scientific research area.

Hewlett-Packard is featuring the business and scientific sides of its product range. The HP120 personal computer will be running business planning systems while the HP9845C with colour graphics will be available for design and scientific applications. The company's plotting products will be represented.

Higher up the processing scale are Systime Computers, Fungus Computer Products and Zeta Systems - all with DEC and compatible processors.

Systime is still buzzing with the injection of £8 million from the US computing giant Control Data. Systime covers Wales and the Southwest from Bristol, where it has a sales and support office.

Systime is showing its 5000 range, based on DEC's PDP-11 minicomputer family, which leads up to top-end systems using the Vax 32-bit machines.

Fungus has new and second-hand DEC processors plus compatible peripherals, memory and communications interfaces. Zeta Systems is the UK distributor for General Robotics. The company is showing a system which is compatible with a DEC PDP-11/23, plus a new product which enables DEC users to run CP/M and related applications packages. It comes as a single circuit board.

Among the terminal suppliers the UK firm Data Type Terminals, which manufactures in Cwmbran, will show the results of a year in which it has set up a US operation, produced new graphics terminals and signed distribution agreements.

Data Type's XK1 emulates the Tektronix 4014 with a resolution of 1,024 picture elements by 1,024. It costs £2,700. The XSA has a resolution of 512 by 512.

The fruits of Data Type's contracts with Televideo and Infocube will be on show. Eight- and 16-bit microcomputers from Televideo will line up with Infocube's matrix printer range.

Another UK terminal firm, Cifer Systems, has also had quite a year. Last June the company announced a factory extension which would provide 100 new jobs.

boosting staff levels to 250, increase production to 10,000 terminals a year and quadruple turnover to £20 million in four years.

A third terminal systems manufacturer, Control Recording Systems, specialises in library packages based on microcomputers of its own design and on SSI minicomputers. A spin-off of more general interest is the Bromer terminal, a touch-sensitive device offering full graphics and an infra-red link to a keyboard if needed.

A local distributor, Computer Peripheral Services, is offering Facit terminals and matrix and daisywheel printers, including a new colour printer. It also sells bar-code reading equipment from another Swedish firm, Sundvik.

Evidence of the importance of communications lies in the fact that the two biggest stands are taken by communications companies.

The UK firm Case is demonstrating its Grapevine local area network, which uses existing tele-

COMPEC WALES '83

phone wiring. The network controller directs the traffic to a computer, central storage, a separate network or to the telephone exchange. There is no interference with the voice network.

Master Systems' main exhibit is its switch which enables dumb terminals to link to a variety of local or remote mainframes. Links to the public telex and packet switched networks are also available.

British Telecom is heralding the opening in June of a Cardiff node in the packet switched service. This will save costs for South Wales users who currently have to make trunk calls to the Bristol node. BT is demonstrating the service on the stand.

Delcan and GBH Computer Services will be competing as local distributors of magnetic media from 3M and BASF. And to keep all the equipment running Sol-Banner is the European distributor of Sola Electric power supplies and regulators.

Over half the companies on show are local - and the Welsh Development Agency will be seeking to attract more companies into the area with offers of industrial sites and finance.

COMPEC WALES PREVIEW

Della Bradshaw discusses the vital role of the Welsh Development Agency

Investment in high tech is vital to Welsh recovery

AT THE end of last month Cwmbran County Council and the North-east Wales Institute of Higher Education announced that a £2.5 million advanced technology centre is to be built at Deside Industrial Park in Cwmbran, North Wales. It would have been impossible without the Welsh Development Agency, which is providing the factory.

The Welsh Development Agency has agreed to build a 60,000 square foot factory which will be divided into 19 units, the smallest measuring 500 square feet. One third of the complex will be taken up by Newtech, an innovation centre based on the North-east Wales Institute of Higher Education's research division, which has 60 graduates.

Newtech intends to make microcomputer and biochemical expertise available to those companies in the area which lack in-house facilities. The other units will be used typically by manufacturers or assemblers of microprocessor hardware or by research

Data, manufacturer of the Dragon 32 home computer. Dragon also got a forward factory from the WDA, this time at Kenfig, near Bridgend, and a £335,000 investment.

Financing companies in Wales is very much a dual-pronged attack. The WDA can only invest, it cannot give grants - they come from the Welsh Office, as Gerry Tufts of Data Type International found. "Data Type started up in 1979 as a maintenance company, so we didn't attract either grants or investment - for that you have to be a manufacturing company. But in the last two years we have picked up the grants from the Welsh Office. I would say it's not really more than £30,000 in all."

Data Type, based in Cwmbran in South Wales, now manufactures computer peripherals and terminals, including the Atlas family of DEC LSI-11 based microcomputer systems. About a year ago it announced the acquisition of Tele-Dynamics GmbH, a German DEC terminal supplier, and also set up a US marketing company, in Mountain View, California.

The money for all that came from a £325,000 capital injection by Clitcorp Development Capital, the high technology investment arm of Clitbank. Tufts explained why the money came from Clitcorp and not from the Welsh Office or the WDA.

"We followed the City route for investment because at that time it was better for us. The WDA is interested in investing money in Wales, whereas we were looking towards Germany and the US. At the moment though we are talking to the WDA about a 20,000 square foot factory we want to put up. That's the sort of thing they are prepared to help with."

Data Type gets a two-year rent free period on the factories it is already occupying. That comes from the local development authority, which claims it back from the WDA.

As well as forward factories and capital investment, the WDA can also make loans available for the purchase of buildings and equipment and also to provide working capital for expanding businesses or modernisation. Loans range from £10,000 to £500,000 and are for five to 10 years. There are also low-interest loans for businesses with fewer than 20 skilled employees which are located in rural areas. Every new job created means a £7,000 loan.

The WDA also handles some rather unusual EEC loans. For example, any manufacturing business which creates jobs in an area in the coal or steel industries in South or North-east Wales is eligible for low interest loans between £5,000 and £250,000. Only two new jobs have to be provided to make the company eligible for a loan.

It is not necessary to create any new jobs at all for small to medium sized companies to qualify for a loan from the European Investment Bank (EIB). Interest rates on those loans are fixed for the duration of the loan. The rate at the moment is about 14%.

To add to the confusion there is Hafren, offering WDA funds for venture projects in Wales, which are initially more risky but have the potential to produce higher returns.

Hafren will invest anything from £10,000 to £100,000 by way of ordinary shares, preference shares or unsecured loans. To date 14 companies have taken advantage of the Hafren terms.

investments, Wales has other things up its sleeve - regional development grants. That means up to 22% of the capital cost of buildings in special development areas and 15% in development areas. Both Inmos and Mitel, the Canadian telecommunications company, took advantage of the latter.

The official opening of Mitel's Newport factory will not be until the summer, but already the company has been visited by the Prince of Wales.

Inmos was another Welsh factory that had a royal visit last month. The Prince witnessed the UK's first 64K dRAM come hot off the production line, and then complained about all the white overalls he had to wear. As well as the controversy about the money ploughed into Inmos by the British

Technology Group, the company got considerable sums from Welsh sources as well. Inmos' factory in Newport, Gwent, qualified for at least £3 million in regional development grants. On top of that it got £14 million from the EEC steel displacement programme budget.

Other companies also look as if they are being attracted to Wales by the WDA. As well as the Newtech innovation centre, the Deside Industrial Park has already attracted several prestigious high technology projects, not least of which is Deside Titanium and Optical Fibres, a £17 million joint venture between Corning Glass and BICC. With Deside still reeling from the 8,000 redundancies created when British Steel closed down its works three years ago, the area desperately needs the industrial park to succeed.



The Prince of Wales donned this natty suit during his Inmos visit.

COMPEC SCOTLAND '83

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Your guide to the firms on show

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Climbing over Great Wall of DP

Tom Crowe tells how contracts are forged between China and the West

ALL was arranged. I was scheduled to do a month's work in Penang for the British Council before going on to Singapore to join the rest of the Thames Polytechnic systems analysis courses there over the summer. Then out of the blue came the invitation from the Chinese government to go to Peking and give a seminar.

The China trip proper started at Hong Kong where we caught the train to Canton and from there we caught the Canton-Peking Express. We had great difficulty later

explaining to our Chinese host why we had gone by train instead of flying — it was a once in a lifetime opportunity to make the two-day journey from Canton in the south of China through to Peking in the North.

Arriving in Peking we were accommodated in a modern hotel in the centre of the city and were issued with our regulation black chauffeur-driven saloon and interpreters (one for social discourse and one for more technical matters). Initially the work was quite easy because we had started off

with two days sightseeing, cleverly having managed to arrive at the start of a weekend. First we made the mandatory trip to the Great Wall. We followed the Monogolian Express up the pass, pulled by two steam

trains until it disappeared into a tunnel and we had arrived at the Great Wall. The next day, with the help of our technical interpreters, we visited the Forbidden City. The technical interpreter was one of two systems programmers

who had just spent a year with Univac in England learning about Univac database technology. The serious work started on the Monday when I gave my first seminar in a room in our hotel. I pitched in describing the work we were doing at Thames Polytechnic.

In the absence of anyone to disagree I explained how the universities in Britain had got the design of the computer science degree wrong, and how industry was constantly complaining about the products of the university system.

In the Polytechnic we had started by recruiting all our staff from industry and had designed a degree with the emphasis on the professional skills required by a systems analyst or software engineer. The teaching is supported by placing the student in industry for a full year as part of a sandwich course. I explained that most of the staff were involved in consultancy with industry. To my surprise, this contrasted with the Chinese universities which lack the close association with industry that we have at Thames.

Lecturing through interpreter took some adjusting to. At first I forgot to pause, and I had chosen my words carefully, avoiding colloquialisms. I then started my first seminar on entity modelling. Although one or two students were aware of this approach to analysis, it was new to most. However, they were very quick in mastering the technique at subsequent workshop sessions revealed.

The students were from a variety of backgrounds including the Academy of Science, the Universities of Peking, the Bank of China, and the China Computer Services Corporation which was my immediate host.

Many had experience within their organisations of a wide range of databases, including IMS, Burroughs, Prime, Hewlett Packard, and Univac. It seemed that the Chinese has purchased many database systems from the West, and I was told they had developed their own database management system based on a Chinese mini in Shanghai.

In my second session, after the compulsory Shao-Shao siesta which is guaranteed in the Chinese constitution, I talked about our efforts at Thames to redesign our degree. Here I developed the theme that the teaching should be problem-oriented rather than solution-oriented.

I also introduced the concept of structured analysis design that has strongly influenced our philosophy in the second year of our degree. I described the package courses we had developed for industry and the associated workshop sessions. I then had to explain what a workshop or case study was. The next day the class insisted on their own workshop.

I went immediately into role playing and said their masters were not impressed by their work so I had designed a time-accounting system. I don't think the Chinese were used to role play. On making my announcement the interpreter

nearly had a fit, taking what I said on its face value, he uttered a sound, spelt something like "AAAAHIOU".

I explained that it was all made believe and only a case study. From then on we made progress. In the final session I concerned myself with controls. Here I met curious culture gap in that the students had no concept of the principles of auditing.

Next day was a free day and we hired bicycles for 25p a day, dismissed our car and interpreter and prepared to do Peking by bike. However, I was first invited to visit the International Economic Information Bureau.

The visit to the bureau started a rather formal affair with meeting drinking Jasmine tea surrounded by all the section heads. After the initial introduction, I decided that an hour of plus plauds would get me nowhere, so I suggested through the interpreter that I might have a polite argument with them if they were agreeable. They were terribly polite and said that they would like that.

The first observation I made was that China had purchased many different database management systems from the West, but that, in the vastness of China they had difficulty in developing a "critical mass" of users for any one system. This creates problems in a speciality where progress depends so much on shared experience.

"State of the art" was a difficult phrase for the interpreter. I do not know if they agreed, but they liked the bit about "critical mass". Next I explored the career development of individuals working on computer systems. Many of the DP professionals had been to the US or the UK. I explained that in the UK there tended to be two types of individuals: those who managed a career by job hopping, and those who developed a career with one company. They could see the advantage of a variety of experience to an individual, but did not see it fitting into the Chinese way of life.

Next we discussed what was the best approach to computing. I suggested that one must be irreverent and heuristic, because technology moves so fast that by the time one perfects and thoroughly understands one's system, new technology renders the experience useless.

I cited the example of the statistical work on tape blocking factors. By the time the work was published and the formulas corrected, discs had swept aside. I thought I detected a split in my hosts, with the younger members nodding and smiling.

The formal part of my visit ended with the Duck Banquet. After a while I felt that I should offer a toast. "Gentlemen," I said, "The Revolution." Then, after a silence, I added "The Computer Revolution".

Tom Crowe is head of the systems analysis division at Thames Polytechnic.



For the visiting data processing expert there's a small charge for bike power — 25p a day.

LANGUAGES

Going Forth into higher productivity

Frank Dale gives a flavour of a popular language

TODAY the cost of development of machines using micros lies not in the hardware but in the programming effort, the software. So any help in increasing a programmer's productivity can cut costs and increase profits. Forth users claim they can produce software in one-tenth of the time it would take to code in assembler, and in half the time it would take to code in any other high-level language. That sort of claim merits serious consideration.

If your concern involves real time control, needs to utilise true in-line assembler code for those parts of the task where speed is critical, and needs to embed the final program in ROM rather than having to be down-loaded, then Forth is for you. It is also for those who want a well-structured language, transportability to other machines, a compiler with the ease of debugging of an interpretive language, with compiled code which is extremely compact and very fast in execution.

That is not to say that Forth is not equally at home in other application areas such as accounting or record keeping. But it was invented by a "real time" man to solve real time problems. And it is in real time and control areas that the advantages of "going Forth" can most easily be seen.

When Charles Moore invented Forth, he invented a new concept in computer programming. Forth was originally used by its inventor to control the telescope and equipment at the Kitt Peak Observatory.

Over the next eight years it grew and developed into the present-day language. It has been implemented on a variety of machines, from the IBM 1130, via the minis, to today's eight-bit and 16-bit microcomputers.

In California, film companies are using the language to drive computer-controlled film cameras shooting sophisticated battle scenes in space adventure movies. And in using its own version of Forth, called gameForth, which will replace machine code as the language used to create arcade

games. And it now provides a version of Forth to run on its 400/800 microcomputer.

At a medical centre a PDP-11/60 programmed in Forth simultaneously manages 32 remote terminals, stores patient data from an optical reader into a large database, runs a statistical analysis package searching the database for trends in physical make-up, treatment and results of similar patients, and analyses blood samples sent heart behaviour.

Allen Test Products of Kalamazoo, Michigan, has developed a machine to analyse the behaviour of motor car ignition systems. It displays both diagnostic and corrective information on the engine under test.

The newly-released Quasar/Panasonic hand-held computers run under a version of Forth called snapForth. A development of the Apple computer so that users can develop their own applications, burn them into EPROM and then plug the chips into applications sockets on the hand-held computer.

In fact, it is used in applications as far apart as sorting and grading peaches to satellite/ground telemetry in a military satellite.

In the UK a small but increasing number of companies are "going Forth". Infrared Engineering of Malden, Essex, makes sophisticated measurement control equipment. Its machines use infrared light as a method of measuring the moisture content of materials and of determining very fine calipers.

Dr Hindle of Infrared says the firm decided to program in Forth six years ago. It formerly used Forth, called gameForth, which will replace machine code as the language used to create arcade

tion, any application which needs 2,000 bytes upwards will benefit from the compactness of the language.

Charles Moore has said that when he set out to invent Forth his goal was simply to make himself a more productive programmer. He reckoned that a very good programmer could write 40 programs in 40 years, and he wanted to write more than that. He thinks that now he has increased his output by a factor of 10.

Forth is not only a language (most of it written in Forth), but a complete computer environment for solving problems. It is an interpreter, compiler, assembler, an editor and operating system, all packed into one small bag. It is fast in execution, and the compiled code is extremely compact — a boon to microcomputer users.

The entire operating system and word-set requires less than eight Kbytes. Compare that with a Pascal compiler which often needs, with the supporting disc-operating system, 48K or more.

For an application which is going to be burned into a ROM, like a microprocessor controller for a washing-machine or a motor car, or indeed hand-held computer program, Forth's compiler, the terminal handler and disc system — anything not needed to run the program — can be stripped out to leave a compact ROM package.

And the program which sorts out the bits your application needs and compacts your application into ROMable form is — you've guessed it — written in Forth.

No other software is needed anywhere in the computer. But if you have a host disc-operating system, Forth can read and write files to that system as well as using its own in-built disc system. If you have a ROM monitor, Forth can use it. Forth can link together otherwise incompatible pieces of systems software and hardware.

As far as the disc operating system (DOS) is concerned, that also is Forth.

Forth does not use a file oriented DOS, though if you feel the need for one it can easily be written in Forth. It treats disc as virtual memory.

Forth treats all bulk storage as a series of numbered blocks, each block containing 1,024 bytes of data. Internally in the Forth system are a number of block buffers which act as windows into the bulk storage. Programs read and write to the buffers. Whenever a program needs data from a particular block, that data is automatically read into a buffer.

If the data is not changed in any way, then the next time that buffer is needed to hold a different block the new data just overlays the old. However, if the data in a buffer has been modified, the contents of the buffer are written back to the disc block before the new data is read.

The whole system is transparent to users; they will find their data in the buffers whenever they need it. The whole of their disc memory is "virtually" in core memory (RAM), and they can manipulate data which is bigger than the available RAM. In effect, core memory has expanded to the size of bulk storage.

Forth is not a language which is complete in the sense of being an academic's idea of what a complete and sufficient language should contain. And it is not a language designed for teaching programming to novices. Forth was invented to provide the extensibility needed to solve the variety of programming problems usually encountered in real-world control situations.



One of Forth's applications is in a military satellite.

Forth is a threaded interpretive language (TIL) and its goal is to reverse the trend towards language standardisation advocated by the users of large computer complexes. Embedded in the language is a compiler which allows the user to extend the language and redefine operators and data types. It is a way of developing a standard non-standard language.

Central to the Forth machine is a dictionary, held in memory, containing keyword structures. Each structure contains the name of the word, and a body. Primitive keywords have code bodies consisting of machine code which implements the action of the keyword.

Secondary code bodies consist of lists of addresses of previously defined primitives and secondaries. Primitives are very like subroutines, and secondaries are very like thought of as lists of subroutines.

The outer loop of any TIL is a secondary. Any dictionary word can be executed just by typing its name.

Each call to a primitive from a secondary causes the machine code of the primitive to be executed, and then control is returned to the next instruction in the secondary (the next address in the threaded list of addresses).

If the next address to be executed is that of a secondary, then the next address [plus one] is stored on a return stack. When the new secondary has completed its particular list of threaded addresses it retrieves the return address so that the next instruction in the calling secondary is executed.

The ability to define words in terms of other words is called "extensibility" — the user can extend the vocabulary of the language to suit the problem. Other languages come with a fixed list of data types, case statements and the like. Forth has none of this.

If you need a case statement, then you define one for yourself. If you want a three-dimensional array, you build one. Two of Forth's words — `<BUILDS` and `DOBS` — a very powerful pair which allow one to define new defining words.

Every word you define can be debugged immediately, in an interactive mode, from the terminal. There is no need to write "stub" programs to run the word — just type in test data and then the name of the word. Forth programmers can produce the most bug-free code.

mnemonics. So new primitives can also be compiled into the dictionary. The act of programming in Forth consists of defining new words, each word defined in terms of words already existing in the dictionary.

As soon as a word is defined, it can be used in another definition. Eventually one word causes execution of the entire program.

The National Computing Centre has recommended that Forth be used in schools because of the ease with which teachers can configure a dictionary to be within the competence of the least able of the pupils

It is a recursive language, in that a definition can call itself in the process of its own definition. It supports multi-users. And it is a highly transportable language. Once the 50 odd primitives have been written for a different machine, a trivial job, that machine is capable of compiling its own Forth system from source to source text.

It is also interactive, in that any word or group of words can be executed directly from the keyboard. It can even cause an application to be executed from disc. One of Forth's words is `FORGET`, which forgets all or part of itself from memory. It is not unusual for an application to compile itself, execute itself, and then forget itself, thus freeing core memory for the next application.

At the other end of the scale, a "splitter group" from the Sinclair works now offers a Forth machine based on the ZX81 and called the Jupiter ACE. It is a low-cost cassette based machine.

Finally, the National Computing Centre has recommended that Forth be used in schools because of the ease with which teachers can configure a dictionary to be within the competence of the least able of the pupils.

The wind seems fair for Forth as it sails into the information age, from primary schools, through everyman's hand-held computers, spreading through manufacturers and the business world, and out into space communicating with satellites and the stars themselves.

Although implemented happily on today's eight bit machines, it is essentially a 16-bit language. The compiled list of addresses are 16-bit addresses, and Forth uses 16-bit stacks. So it is very much at home in a 16-bit machine.

Now Forth Inc has announced polyFORTH/32, designed for the Motorola 68000 microprocessor and completely compatible with the machine's 32-bit architecture.

It is a multi-user system capable of accessing directly up to two gigabytes of memory and two Gbytes of disc storage without the addition of a memory management chip.

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The wind seems fair for Forth as it sails into the information age, from primary schools, through everyman's hand-held computers, spreading through manufacturers and the business world, and out into space communicating with satellites and the stars themselves.

The Forth Interest Group UK can be contacted through Keith Goldie-Morrison, 15 St Albans Mansions, Kensington Court Place, London W8 5QH. Computer Solutions is based at Treway House, Hanworth Lane, Chertsey, Surrey KT16 9LA.

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What modern computer science is all about

Computer Science: A Modern Introduction. L. Goldschlager and A. Lister. Prentice-Hall International, 303pp.

THE last few years have seen the growth of introductory courses in computing whose major thrust is not the traditional one of learning about hardware and programming. This text is clearly aimed at such courses.

The central theme of the book is the algorithm. Thus the areas covered include the design of algorithms, including stepwise refinement, sequencing, selection and iteration (but not abstraction, which seems strange), modularity, recursion, parallelism and data structures. Inevitably these topics are treated very superficially which is a pity since generally they are treated rather well at an elementary level. If the space allocated to each section had been increased by 50% this would have been an excellent text.

Particularly welcome are sections on computability, complexity and correctness. Conventional discussions are given of machine architecture and system software, including a good elementary discussion of compilers and operating systems. The least successful parts of the book are those which deal with data processing applications, artificial intelligence and social issues.

There is much in this book which would be of interest to anyone who wanted to gain some knowledge of what constitutes modern computer science.

John Cookson

Asking a lot of the reader

Program Verification Using Ada. A. D. McGettrick, Cambridge University Press, 345pp.

THIS is a very ambitious attempt to deal with a complex and difficult topic. The target readership is second and third year undergraduates and others interested in the problems of producing correct programs. In presenting this important topic it is far from completely successful.

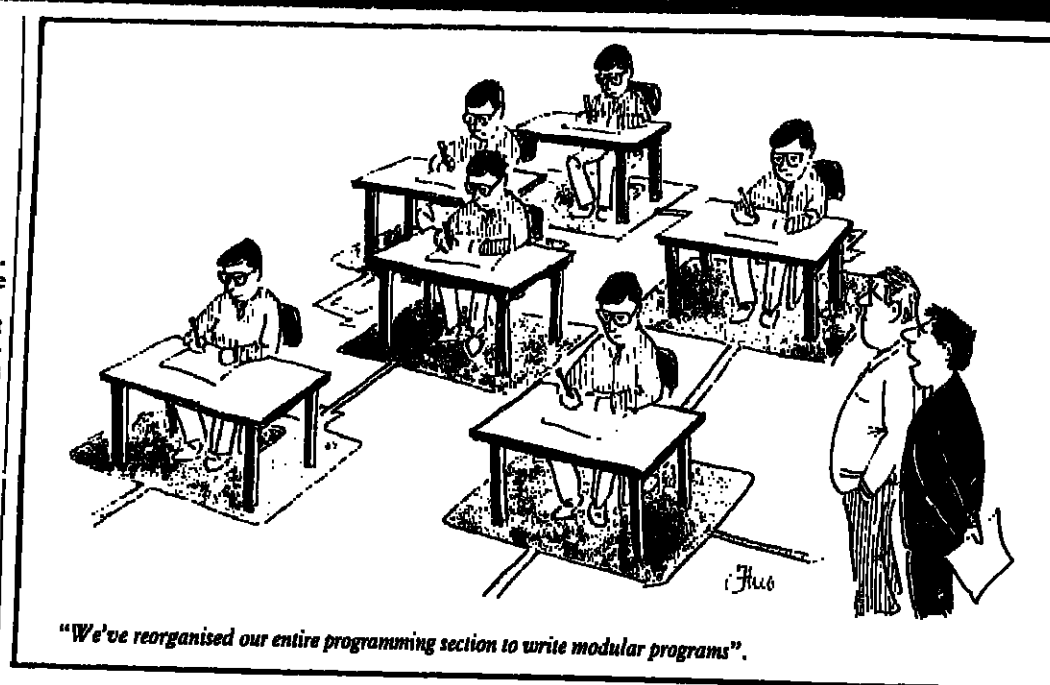
It asks a lot of the reader to tackle the difficulties of program verification in a language with which he will not be familiar. The author realises this and is therefore compelled to explain in some detail aspects of the syntax of Ada. This would be difficult to follow for a programmer without prior experience of a similar language such as Pascal or Algol 6.

The text is well-written, but hard to read. The student is not helped since essentially this book is about the verification of small program fragments. Verification techniques are so complex and long-winded that to apply them at present the user requires strong motivation. An example of a project which by its nature required the production of correct programs would be more appropriate.

Presenting verification techniques out of the context to which they most sensibly apply means that the topic is given the appearance of being arid and of simply academic interest.

There is a need for an introductory text on program verification techniques, but this book is a hard way to gain knowledge.

J.C.



Questions to ask the software supplier

The CPM Software Directory 1983 for Professional Microcomputers. Edited by Vision Associates Cambridge Information and Research Services. £12.50.

PINNING down products and suppliers in a mushrooming industry is no mean feat, but Vision Associates has made a successful attempt to do so. The CPM Software Directory contains details of over 350 products, all developed to run on the standard eight-bit micro operating system CPM in a business environment.

There are 99 subject classifica-

tions for the software, covering systems for bankers, turf accountants, video libraries, sewers, auctioneers and dentists, to name a few. Database is the largest section, containing familiar names such as dBase II, Condor FMS-80 and Superfile, with the integrated accounting systems coming a predictable second.

Software packages are listed in alphabetical order under each subject according to product name, with the supplier and reference number within the directory of products. The directory section gives a brief description of the

system, its price and the full name, address and telephone number of the supplier, plus a contact name. In addition to telling the reader where to find the right system, the CPM Software Directory also suggests some appropriate questions to ask the supplier, which would be useful for first-time buyers. At the back is a list of members of the Computing Services Association, and a description of facilities provided by the National Computing Centre, which could also prove invaluable to the uninitiated.

Maggie McLening

Papers in need of stronger editing

Intelligent Tutoring Systems. Edited by D. Sleeman and J. S. Brown. Academic Press, 345pp. A COLLECTION of papers on the application of the methods and approach of the artificial intelligence community to computer aided learning. Intelligent Tutoring Systems suffers from all the problems associated with such a collection. The papers are of uneven quality and could have done with stronger editing to make them more readable.

Considering that this is the first book devoted specifically to this topic it is a pity that more use was not made of the opportunity it provided to make some extremely interesting work accessible to a wider community.

The text contains discussions of most of the major landmark developments in this area in the last few years. Particularly interesting

are Brown, Burton and de Kleer's description of the evolution of Sophie, Burton's paper on bugs, and Genesereth's paper on plans. This last paper is one of the better written contributions.

Several other contributions would be greatly improved by being translated from pure American AI jargon into something approaching English.

The problem with a text such as this is identifying its possible readership. To understand many of the papers needs a strong background in AI. This would tend to restrict its readership to practitioners in the AI area.

A teacher attempting to learn what was the current state of the art in ITS would find the text provides too little of the necessary background information.

J.C.

A crash course in comms

A Practical Guide to Computer Communications and Networking. Richard Desington. Ellis Horwood, from the series, Computers and their Applications. £16.

JUST over 120 pages is not much space in which to lead someone with no knowledge of computer communications all the way from a definition of batch processing to the writing of an assembly language ICL emulator for a Digital Equipment minicomputer. That is what Richard Desington's book sets out to do.

For an experienced systems programmer or computer scientist, it is just about speeded. But for other readers the publisher is aiming at — personal computer, and small business system users — the book would soon become a struggle unless these small computer users

were already well versed in how a processor handles data.

The book is in two halves. The first three chapters introduce computer communications. Desington describes how data travels over telephone lines and moves quickly on to Baudot, ASCII and EBCDIC codes and parity bit error checking. He describes parallel and serial transmissions, with separate sections in synchronous and asynchronous communication, then goes into detail about models, defining 16 commonly-used V24/RS232-C interface signals.

A chapter on networks devotes much space to packet switching and the X25 interface, while multiplexers, like modems, get detailed attention.

These first three chapters provide a crash course in computer communications in under 60

First-level introduction to Forth language

Forth Programming. Ian Scanlon. Prentice Hall, 246pp. £13.55.

FORTH was developed by Chuck H. Moore starting in the late 1960s. But it is only now that it is being accepted as a powerful, fast and flexible language among the microcomputer fraternity.

As with any new programming language that is becoming popular books will be written about it. Forth Programming is one such book, which should provide the reader with an interesting first level introduction to the language.

The introductory chapter gives a brief description of Reverse Polish Notation and the Stack. Unfortunately neither is covered in any great detail. This will tend to confuse the reader, especially the novice, as he continues to read the book, because a thorough understanding of these subjects is essential in learning the Forth language.

The two most popular dialects of Forth are described in the book — Forth-79 and Forth-82 — but the bias is towards Forth-82. Where either dialect lacks a particular function/feature that the other has, Scanlon presents a definition of the missing "word" (program) and describes how, once compiled, the new entry can be used. This is clearly an excellent way to demonstrate Forth's flexibility, but besides the examples mentioned, as well as some others, there are no more programs (sorry, words) to demonstrate Forth's capabilities.

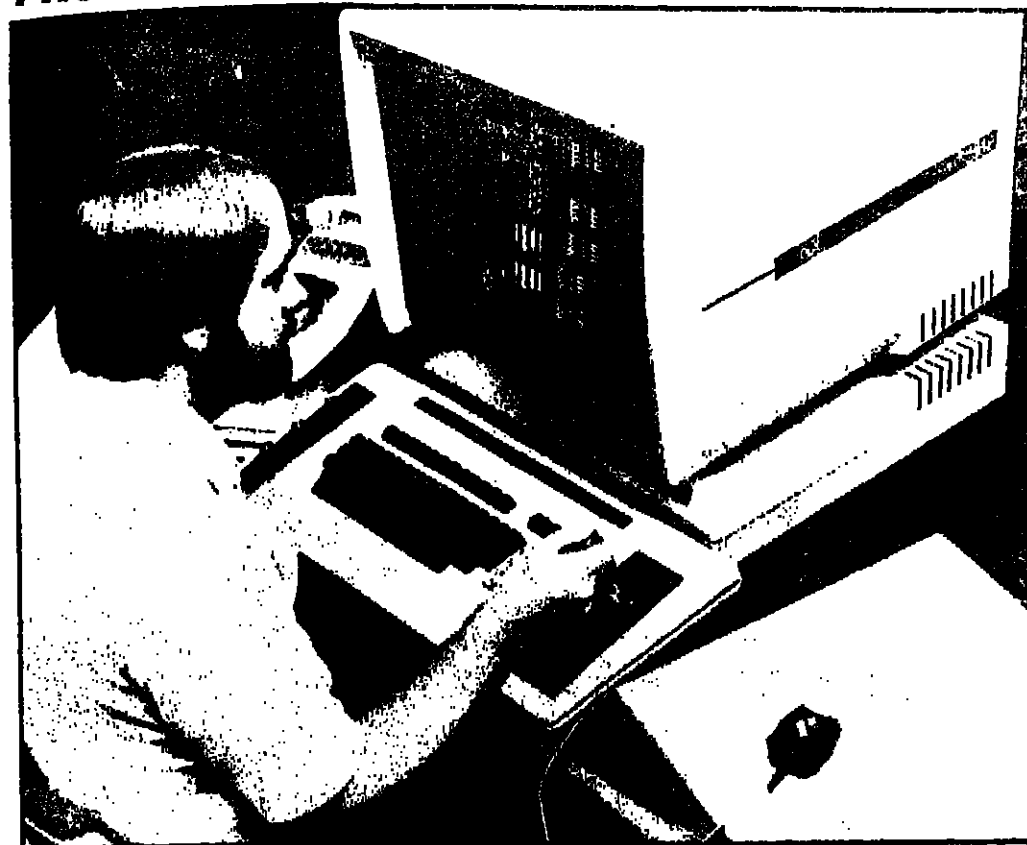
This is a pity because Forth has very fast on microcomputers and with its stack/memory addressing facilities external control is possible. A case study along these lines would have been welcome, but this is not the case.

The remainder of the book conforms to a standard format that is typical of most introductory books on programming languages. Main subjects such as arithmetic functions, control structures, etc. are presented in individual chapters together with a table of Forth words that relate to them.

Forth's features of increasing complexity are tackled as the book progresses, until at the end the level instructions are mentioned. Because of Forth's very fast speed, Forth Programming would appeal to the microcomputer programmer. But beware, the book cover blurb says that the book is suitable for anyone who wants to learn how to program in Forth. This is not the case; it will induce the reader to the Forth language, but due to the sparse discussion on particular features, little else can be achieved with the book.

David Janda

PRODUCTS



Megatek's Whizzard graphics terminal.

Megatek puts raster graphics on desktop

MEGATEK Europe has unveiled the first of a new series of multi-function, colour engineering graphics terminals in a move which brings the high performance Whizzard graphics systems into the medium-priced desktop environment.

Designated the Whizzard 1650, the new raster terminals are the first to provide high resolution graphics concurrent with alphanumeric capability, says Megatek.

Prices start at £10,000. Megatek will demonstrate the new Whizzard terminal at the Hannover Trade Fair, April 13-20.

The Whizzard 1650 joins a range of Megatek products distributed in Europe through local companies that specialise in graphics terminal products. These com-

panies are provided with immediate support from Megatek's European HQ in Lausanne.

In bringing this state-of-the-art graphics terminal to Europe, Megatek has recognised the advanced nature of the engineering environment here and the rapidly expanding market for computer-aided devices required to facilitate its growth, according to Megatek's vice-president of marketing, Hilmar French.

The new Whizzard 1650 is specifically designed for engineers and brings the power and functionality of top-end systems to the user's desk.

Megatek Europe (CW), Lausanne.

Storage Technology has launched an accelerator for use with its 3600 series of IBM plug-compatible tape sub-systems.

Known as the 4800, the new device enables data transfer between advanced processors and existing tape drives at full channel speeds of up to three Mbytes per second.

It eliminates the throughput bottleneck created when newer IBM and compatible processors with their higher speed channels are used with tape sub-systems optimised to earlier CPU channel speeds, says Storage Technology.

The device is externally attached to the Storage Technology 3800IV Tape control unit and does not require any software modification. Until now, one tape loaded onto an entire channel, bringing throughput down to the speed of the device rather than the faster speed of the channel. The 4800 Accelerator replaces this protocol with a much more efficient method.

It is a 64Kbyte intelligent buffer logically located between the host CPU channel and the tape control unit. Working under timing sequences determined dynamically by the controller, the accelerator enables the tape sub-system to disconnect from the host channel between record transfers, thereby freeing the channel for other users.

Storage Technology (CW), Churston House, Exeter, Surrey, Tel: Exeter 67041.

Versatile dot matrix printer

A MULTIPURPOSE dot matrix printer, the Facit 4510, is now available in the UK from Advent Data Products.

The 4510 has been designed for use in applications where a small but versatile professional printer is required. It can accommodate fan-fold, roll and single sheets of paper and can print a number of different fonts for text applications.

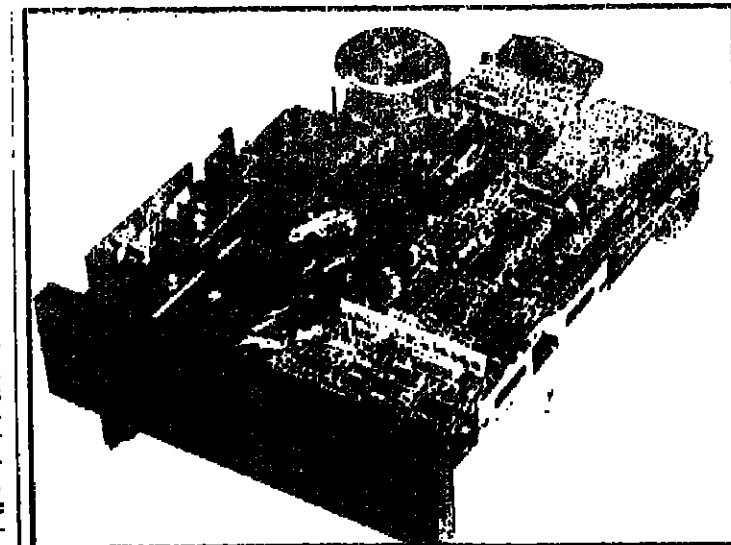
Seven national character sets are available including Swedish/Finnish, Danish/Norwegian, German, British, Italian, French/Belgian and Spanish. Block and pin graphics capabilities with three different resolutions are also standard.

Sixty-four Viewdata/Prestel compatible block characters are also available.

The operator can select printout modes by means of a rotary switch on the control panel. The modes include font selection (10, 12 or 17 cpi in standard resolution 9x9 matrix, and 10cpi either monospaced or proportionally spaced in a high resolution 9x15 matrix). It is also possible to select block graphics or pin graphics plus a transparency mode where the printer is code transparent to all control codes except carriage return (CR) and line feed (LF). All modes of printing can be selected by the host computer.

The printhead is a 9-wire device which is operator exchangeable and printing speed is 120 cps at 10 cpi. Printing is bi-directional with minimum distance sensing logic and throughput is 55 full lines/minute at 10 cpi. Line length is a maximum of 80 columns at 10 cpi but can be set to 40 columns by switch or to any value from 12 up to 80 columns by software commands from the host.

Advent Data Products (CW), Merlin Way, Boverhill Industrial Estate, Melksham, Wiltshire, SN12 6TJ. Tel: 0225 706289.



Tandon's TM55 Thinline 5 1/4 inch floppy disc drive.

Tandon floppies 'equal' to full-size 5 1/4 in drives

TANDON Corporation has announced a family of half-height 5 1/4-inch floppy disc drives that are said to equal the capacity and performance of full-sized 5 1/4-inch drives.

Sirjang Lal ("Jug") Tandon, chairman and president, says: "Two of our new TM55 Thinline drives can double the memory capacity of word processors, small business systems, and intelligent terminals, yet occupy the cabinet space of one standard-sized drive. Our new half-height floppy is especially practical for emerging portable and instrumentation systems."

Production units, available now, are initially being manufactured in Chatsworth.

The TM55 is priced at less than \$200.

The new TM55 series is an expansion of Tandon's 5 1/4-inch half-height floppy drives introduced at NCC in June 1982. The first model was the TM50, a 250 Kbyte 48tpi drive that sells for \$50 in a mechanics-only version. Tandon earlier pioneered the half-height

configuration in 8-inch floppies with the introduction of the TM800 Thinline series in 1981.

The TM55 features storage capacity up to 1 Mbyte, a fast 3 millisecond track-to-track access time, microprocessor-controlled performance, and a high level of reliability.

Two models are offered. The TM55-2 is a double-sided, 48 tracks-per-inch drive with 2-Mbyte capacity. The TM55-4 is a double-sided, 96 tpi drive with 1 Mbyte capacity.

Both TM55 models can read and write in a single-density format or, using MFM or other recording techniques, in double-density format.

Linear recording density is 5877 bits per inch. The TM55 uses an IBM-formatted, industry-standard, 5 1/4-inch diskette.

The 3 msec track-to-track access time is achieved through use of a split-head head positioner driven by a stepper motor.

Tandon Corp. (CW), 20320 Prairie St, Chatsworth, CA 91311. Phone: (213) 993-6644.

Graphics in 16 colours

THE ENVISION 230 is a new colour graphics terminal from Rapid Terminals. It can display graphics and alphanumeric characters simultaneously in up to 16 colours, selected from a palette of 4,096.

Graphics resolution is 640 picture elements by 408 or 480. As an alphanumeric device the 230 can display 24 lines of 80 characters or, by sideways scrolling, up to 132 characters.

The 230 can relieve the host computer of several graphics processing tasks. In particular it can store graphics characters and geometric figures and modify them without reference to the host.

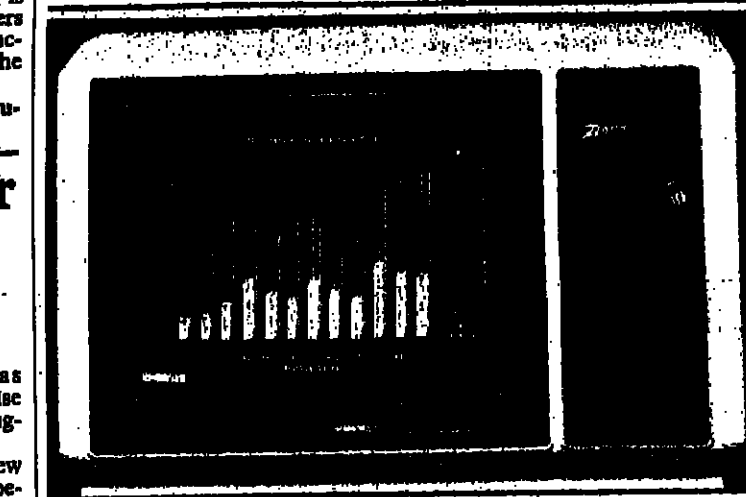
Rapid Terminals (CW), Rapid House, Denmark Street, High Wycombe HP11 2ER. Tel: (0494) 26771.

Low-profile keypad

NEW from Flexible Switch Technology is a 3x4 membrane-switch keypad designed for front or rear panel mounting.

Using high-quality materials including silver contacts and a polyurethane/polyester membrane, the keypad has a sealed low-profile construction, with the graphics printed under the surface to give an easily cleaned and durable front surface.

Flexible Switch Technology (CW), Unit 31, Middlefield Industrial Estate, Sunderland Road, Sandy, Bedfordshire, SE19 1RB.



The Zenith ZVM-134 colour monitor.

Easy-to-read display

ZENITH Data Systems has introduced to the UK its new ZVM-134 colour video display monitor, to complement its range of desktop microcomputers and peripherals.

The ZVM-134 colour monitor incorporates RGB video and a wide bandwidth to deliver a crystal clear display with high resolution. With a bandwidth of 20 MHz and a rise time of 20 nanoseconds, the ZVM-134 will generate crisp lines, pure colours and sharp character definition for easy-to-read display.

Zenith Data Systems (CW), Bristol Road, Cloucester, GL2 6EE. Telephone: (0452) 29451.

1,200 bits-a-second modems

MODEMS handling speeds of 300 and 1,200 bits a second plus viewdata make up the new range from Steebek Systems. The units are available as standalone boxes or as circuit card measuring 19cm x 28cm for rack mounting.

The basic models are a 300-bits-a-second V21 modem, a 1,200-bits-a-second V23 unit and two viewdata modems handling speed conversions from 1,200 to 75 bits a

second and vice versa. Options include automatic dialling, controlled by a computer or a terminal, automatic answering and viewdata conversion with a buffer to handle data overflows.

An associated 19-inch rackling system can handle 12 of the modems in any combination. Steebek Systems (CW), PO Box 2, Pangbourne, Reading, RG8 8PF. Tel: (07357) 4319.

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A crash course in comms

A Practical Guide to Computer Communications and Networking. Richard Desington. Ellis Horwood, from the series, Computers and their Applications. £16.

JUST over 120 pages is not much space in which to lead someone with no knowledge of computer communications all the way from a definition of batch processing to the writing of an assembly language ICL emulator for a Digital Equipment minicomputer. That is what Richard Desington's book sets out to do.

For an experienced systems programmer or computer scientist, it is just about speeded. But for other readers the publisher is aiming at — personal computer, and small business system users — the book would soon become a struggle unless these small computer users were already well versed in how a processor handles data.

The book is in two halves. The first three chapters introduce computer communications. Desington describes how data travels over telephone lines and moves quickly on to Baudot, ASCII and EBCDIC codes and parity bit error checking. He describes parallel and serial transmissions, with separate sections in synchronous and asynchronous communication, then goes into detail about models, defining 16 commonly-used V24/RS232-C interface signals.

A chapter on networks devotes much space to packet switching and the X25 interface, while multiplexers, like modems, get detailed attention.

These first three chapters provide a crash course in computer communications in under 60

New look to control

MONITORING and control is being introduced to a handsome new way of displaying, according to Terminal Display Systems. The Exec 4000 is said to combine the good looks of a wooden case with the performance of the Basycolour 4000 colour video display controller, to form a smart desk-top terminal.

Developed and manufactured at the TDS headquarters in Blackburn, the Exec 4000 comprises the 4000 controller and a high quality 20-inch monitor in an elegant, wooden cabinet. A 32-line by 80 character format may simultaneously display over 256 characters and/or symbols on 64 different colour combinations.

In addition, there is a library of over 100 sets of semi-graphic symbols to suit a host of applications.

Colour sets can also be made to suit the user's needs.

Terminal Display Systems (CW), Phillips Road, Whitebick Industrial Estate, Blackburn, Lancashire, BB1 5TH. Telephone: (0254) 676921.

Easy-to-read display

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CW2

PRODUCTS

Image system available as a peripheral

MICRO Consultants has introduced a computer peripheral version of its renowned Intellect 100 image processing system. Designed for standard 19-inch rack or bench top mounting, the peripheral connects to the Q bus of DEC LSI 11/02 or 11/23 minicomputers operating under RT11, and is supplied at a cost of £9,950, with considerable OEM and quantity discounts.

An optional software package for the system includes Fortran handlers with powerful image processing functions. Users implementing 11/23 disc-based systems using the above handlers will be supplied free with the recently launched ISPEC software package, for use in the development of industrial inspection and robot vision systems.

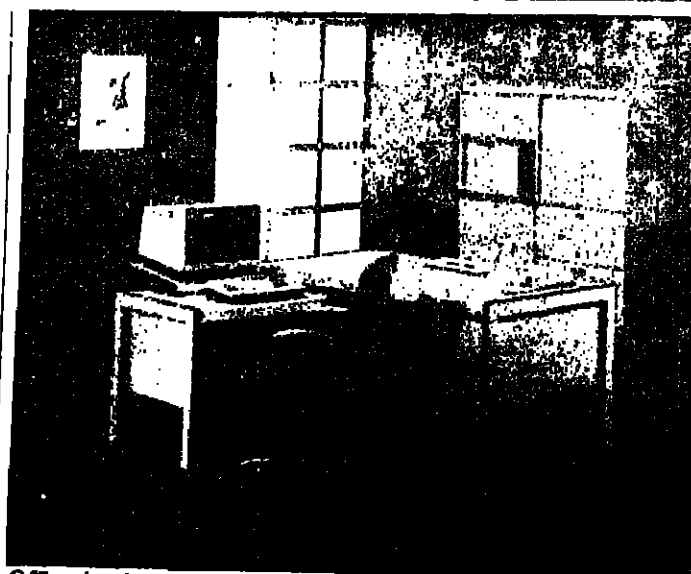
Called the Intellect 100 FS, the unit is said to be ideally suited to OEMs developing their own systems, and requiring cost-effective frame store hardware. It incorporates all Micro Consul-

tant's image processing hardware, including the digital video framestore, video input and output processors and recursive video processor.

Based on Micro Consultants' 512 line x 512 pixel x 8 bit framestore, the device gives 256 grey levels resolution while operating at the full 10 MHz video rate. Interfaces are available for normal TV and infrared cameras as well as for a range of slow scan equipment.

Standard image processing functions available range from image examination facilities, through feature analysis, contrast stretching and image enhancement functions, to recursive video processing and a wide range of control functions. ISPEC provides special feature inspection software with some 150 function and powerful additional Macro facilities.

Micro Consultants (CW), Kenley House, Kenley Lane, Kenley, Surrey CR2 5YR. Tel: 01-668 4151.



Office planning with Steelcase Strafor.

Steelcase provides a path to the future

STEELCASE Strafor says it provides a stepping stone from "traditional" office furniture to "systems furniture" with its new 1030 range.

The range starts with a basic desk, with or without pedestals. From there the user can add drawers and pedestals for terminals and move from a standard machine laminate surface to an

oak finish. The 1030 family matches the company's 9000 panels and 400 cabinets in style, colours and dimensions, so complete offices can be planned using matching units.

Steelcase Strafor (CW), International Buildings, 71 Kingsway, London WC2B 6SY. Tel: (01) 242 2122.

Triumph adds two business printers

TWO PRINTERS have been added to Triumph Adler's range for business applications - the DRH136 and DRH80/1.

A versatile printer for a variety of office applications, the DRH136 is suitable for drafts and correspondence. The 136-column width makes it ideal for accounting printouts, says Triumph Adler. This 120 characters per second system offers five variable typestyles and 11 national character sets, with 32 mathematical/technical characters. The selectable character pitches allow for 10 characters per inch at 136 columns, 12 cpi, 15 cpi, and 16.6 cpi for applications such as pre-printed form printing.

The DRH136 has a number of features: graphics capability, including pin controlled graphics;

vertical and horizontal tabular X-on X-off procedures, and feeds from eight to 127 lines which are selectable via the menu. The printer easily handles one topsize and two copies. An optional extra feature is a sheet feeder. This printer is available with both parallel and serial interfaces for compatibility with Triumph Adler's range of Alphatronic microcomputers.

During 1983 a number of additional enhancements will become available, including a refect 18x18 dot matrix (currently 7x9) for finer printout. The DRH136 is priced at around £675.

The DRH80/1 is available for about £540. Triumph Adler (CW), 27 Gower Road, London EC1. Tel: 01-250 1717.



GOGA... "Flowriter is compatible with any system."

Flowriter switches to universal compatibility

THE FLOWRITER RP1600 daisy-wheel printer from Prototype Development Systems, designed primarily for keyboard, display and online terminals, the teak-finish laminated surfaces, with optional modesty panels and storage compartments, make these units equally suitable for a range of applications in offices, laboratories, clinics and computer-rooms.

Steel frames are finished metallic black and supplied packed flat for easy assembly. Prototype Development Systems (CW), Enterprise House, 44-46 Terrace Road, Walton-on-Thames, Surrey KT12 2SD. Tel: (093 22) 45670.

Qume, Diablo, Philips, TEC and many other word processing commands. Its compatibility with the IBM Personal Computer will be an important marketing advantage. The RP1600 runs at 60 characters a second.

Appropriate Technology (CW), 2-4 Canfield Place, London NW6 3BT. Tel: (01) 635 5575.

Range of stands for terminals

A RANGE of adaptable stands and trolleys, with a choice of double roller castors or height-adjustable feet, is now available from Prototype Development Systems.

Designed primarily for keyboard, display and online terminals, the teak-finish laminated surfaces, with optional modesty panels and storage compartments, make these units equally suitable for a range of applications in offices, laboratories, clinics and computer-rooms.

Steel frames are finished metallic black and supplied packed flat for easy assembly.

Prototype Development Systems (CW), Enterprise House, 44-46 Terrace Road, Walton-on-Thames, Surrey KT12 2SD. Tel: (093 22) 45670.



A Direct 828 can replace a DEC VT100 and an HP block mode terminal.

Direct link between DEC and HP

DIRECT has introduced a terminal which it claims to be the only machine in existence offering both DEC VT100 and HP block mode compatibility.

Known as the 828 this terminal is said to provide the ideal solution for multi-system sites, and to offer both practical and cost advantages over manufacturer-tied equipment. For example, a VT100 and

an HP block mode terminal would cost about £3,000, while a direct 828 does the work of both for £1,995.

By flipping a switch the identity of the 828 can be changed to cater for increased demand on either type of system.

The 828 offers 32K video memory as standard; block mode communications, full local editing

Direct (CW), 12 Rufford Garage, Woolston, Warrington WA1 4RF. Tel: (0925) 814072.

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Within the Software Programming Team responsible for development of an 'in-house' TP system communicating with 8100s, over 400 VDUs and a telex network using VSAM and ACF/VTAM techniques. Ideally experience should include two years' ASSEMBLER in a technical support role, although consideration will be given to ASSEMBLER programmers with an applications background who believe they can contribute in a technical environment.

For further information please contact TONY HATHERALL or MIKE HOPKINS.

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Software is developed using a Host-Target approach. The host computers are DEC PDP11 and VAX machines, supporting INTEL 8086 and T1 8900 microprocessors. Languages used are CORAL 86, PASCAL, and ASSEMBLER, which are normally used in conjunction with a highly developed MASCO design and implementation methodology.

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Please ring Peter Whitfield, Technical Resourcing Manager on Templecombe (0963) 70551 for an application form, or send a full cv to him at Plessey Marine Research Unit, Wilkinstroop House, Templecombe, Somerset BA8 0DH. Please quote reference TEM/241.

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Salary will be on the scale £8,200 - £13,800 per annum.
(Note: This advertisement relates to the salary applicable to this post. Applications already received are being actively considered and these candidates need not re-apply.)

Applications, together with the names of three referees, should be received not later than 28th March 1983 by The Registrar, The University, P.O. Box 147, Liverpool, L69 3BX, Tel. 051-708 8022. Extension 2050, from whom further particulars may be obtained. Quote Ref: RV/888.
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Systems Analyst

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Bentalls is one of the largest independently-owned store groups in the UK and firmly established as a leader in the retail trade.

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The brief is to define and develop retail systems to investigate and implement systems in conjunction with our DP department to work with user departments to ensure operational effectiveness.

This is a key job carrying considerable responsibility for project work. We are committed to developing usage of an IBM System 38 throughout the organisation.

Ideally with previous experience in retail systems, you should be a good communicator who would enjoy working with users to achieve results.

Salary will be negotiated up to £9,000, depending on experience. Benefits include 20% staff discount.

Please send a full cv. to Peter Flower, Personnel Controller, Bentalls plc, Wood Street, Kingston upon Thames KT1 1TX, Surrey.
(2800)

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(Scale 23)

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The existing mainframe is being phased out, and applications on it are being transferred to mini or microcomputers which will be linked by the first Ethernet Local Area Network in the NHS, currently being installed in St. Thomas' Hospital. The transfer to a distributed system must be completed during 1984.

Applications are invited from candidates who have both experience in systems design and the ability to plan, co-ordinate and control all aspects of the many transfer and development projects in which the Department is engaged.

For informal discussion, please telephone Dr A. V. Stokes, Director of Computing, 01-828 8282 x2715. Application forms and job description are available from the District Personnel Department, St Thomas' Hospital, London SE1 7EH (01-828 8282 x2422). Closing date for completed applications, March 31, 1983.
(2921)

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Honeywell DP87, COBOL, IDS, TDS
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IBM 8100, DPCX, Macro Assembler
ICL 2900, OMVME, COBOL, IDMS
ICL 2900, OMVME
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Z80 Assembler

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Programmers
Analyst/Programmers
Programmers
Programmer/Designers
Programmers
Software Support
Senior Consultant
Analyst/Programmers

To apply for any of these vacancies, please ring Tom Roe or Roy Riley immediately, on 061-941 4915 (24 hours). Or send your CV to the address below as soon as possible.

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Altrincham
Cheshire WA14 1DQ

to be able to identify and define a requirement for further EDP professionals to work on various projects within the area of Systems Development. The Computer Centre currently have two IBM 4341 mainframes, one of which is entirely dedicated to a large order entry system, the other being a general purpose machine.

The general purpose machine runs under VM with DCS/VSE and CMS. Systems currently being developed utilise CICS and DL/I.

In addition, the department is on-line to the Texaco Europe Computer Centre in Llanbury, giving access to an IBM 4303, running under TMS with IMS DB/DC.

Analyst/Senior Analysts to £13,500

You should be familiar with all phases of project development, as your responsibilities will include involvement from feasibility through to implementation. During the early stages of development you will work closely with project managers from user departments, and subsequently you will assume full responsibility for taking a project through to implementation.

It is envisaged that you will have spent a minimum of 4 years in D.P., and that you will have had a programming background. In addition to this you should have some supervisory experience, and will ideally be conversant with the development approaches in use at Texaco, namely: PROMPT, Yourdon Structured Analysis, LBMS Data Analysis and Jackson Structured Techniques.

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You should have a strong COBOL programming background, gained within an RPL environment, with experience of CICS and DL/I. (Jackson Structured Programming would be useful). This demanding position will involve the examination of development timescales, the provision of assistance to other programmers, progress reporting and co-ordinating the development effort, so experience in any of the former will be a distinct advantage.

Having spent at least 3 years within D.P., you will already be fully able to take a leading role in system testing, acceptance testing, parallel running and production handover. Furthermore, you will have the flair and dedication to assume the responsibilities of leadership and be responsible for any specific part of a given system.

Programmers to £8,500

Again, an IBM COBOL background is essential, with past exposure to CICS, DL/I and JSP an advantage. You will be required to work as part of a project team, developing the structures, program structures, program code and test plans.

You will have spent at least 18 months within a relevant environment, and will have the determination and ability to progress to a position of responsibility.

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For more information and an immediate interview, telephone Andrew Beacham (quoting reference number 0080), on 01-734 7394, or on 01-223 8507 evenings and weekends.

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(2808)

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Department of Bio-Medical Physics
& Bio-Engineering

COMPUTER OFFICER

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Salary within the Grade 1A Scale for Other Related Staff (£5,973-£11,106 per annum), with appropriate placement.
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(2904)

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Successful applicants, ideally educated to degree level, will be expected to make a direct contribution to one or more specific areas, such as graphics, scientific or business applications, use of microcomputers. A working knowledge of more than one programming language will be required, and relevant previous experience will be an advantage.

For application form and further details contact: The Deputy Senior Administrative Officer, Nene College, Moulton Park, Northampton. Tel: 716000

Closing date for applications: 31st March 1983

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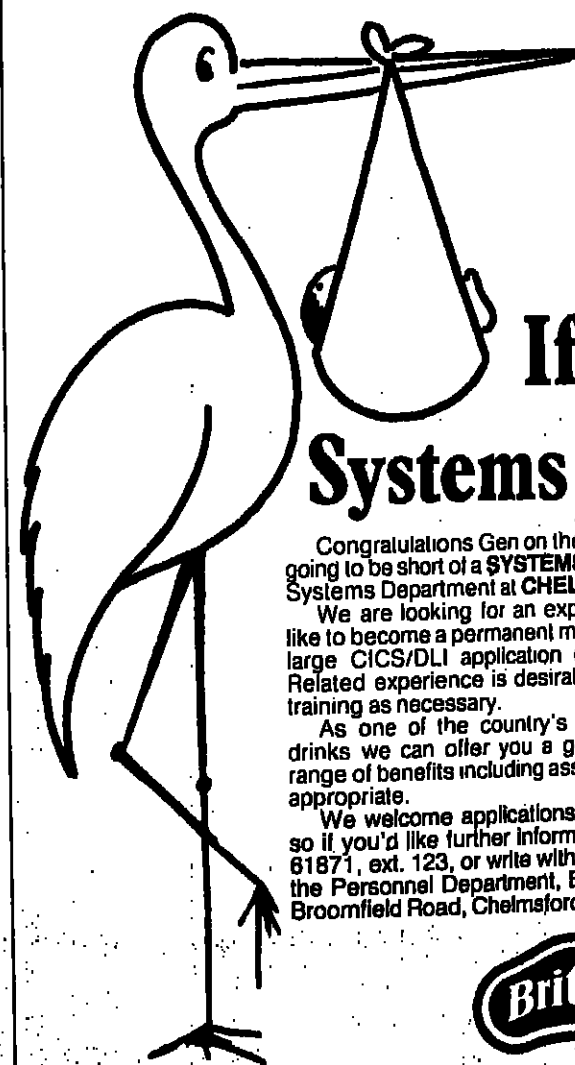
As a result of the expansion of our DEC operations, two Operators with DEC experience are required to help run one of our DEC installations. The operating system used is RSX11 and experience of this would be an advantage but is not essential.

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Successful candidates can expect to join a company where professionalism comes first and where the stimulation of work and experience gained will enhance their careers for many years to come.

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Please write quoting reference 840 with full details to:

Mr C. J. Bailey, Head of Personnel Administration, National Coal Board, Mining Research and Development Establishment, Ashby Road, Stanhope, Brethby, Burton on Trent, Staffs. DE16 0QD.

Closing date for receipt of applications 25th March 1983.

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All candidates should be educated to a least B.Sc. standard in either Computer Science or Mathematics and possibly hold an M.Sc. or Ph.D. in a relevant subject. Suitable candidates will have participated in the design and development of a multi-tasking operating system on either mini or microcomputers. Experience of utilising a high-level language at a systems programming level will be an advantage, as will knowledge of security and protection features, since many of the systems provided by our Client are orientated towards the Banking and Defence markets.

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Suitable applicants should be graduates who have current or very recent experience within a networking environment. It is essential that you offer fluency in a block-structured language, with C or PASCAL being the most desirable. Of particular interest will be candidates who have software and/or systems design experience with a proprietary networking product such as SNA or DECNET. Knowledge of communications protocols will be a distinct advantage as will familiarity with the design concepts underlying any major Local Area Networking system. Applicants should be mobile and, in particular, be prepared to travel to the EEC for short-term visits.

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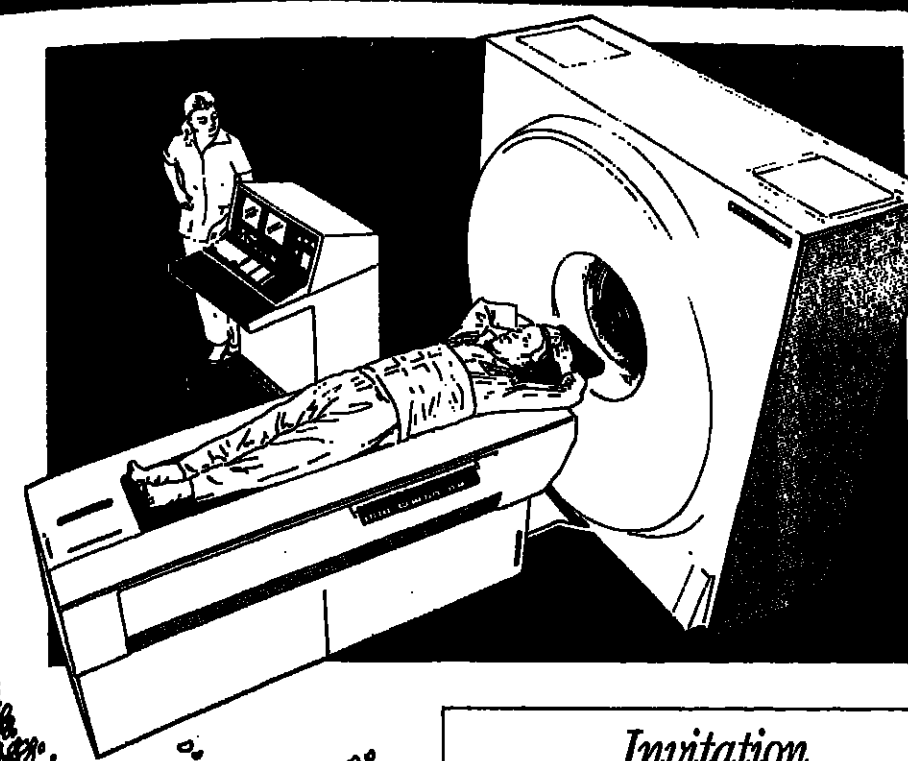
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Working within a comprehensive software/engineering development lab, which because of continuing capital investment, contains a VAX 11/750, several D.G. development systems, plus latest technology in 16 bit microprocessors.

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West London c£11k & Car

FULLER, SMITH AND TURNER, the well established family brewery based in CHISWICK, are now seeking an Analyst/Programmer to join their small friendly department running an IBM System/38.

This is an outstanding opportunity for career progression and the successful applicant must have experience of both programming in RPGIII, and analysis, on normal business systems, and be prepared to participate in both areas. It is unlikely that the incumbent will be under 25 years of age and he/she must be able to communicate at all levels.

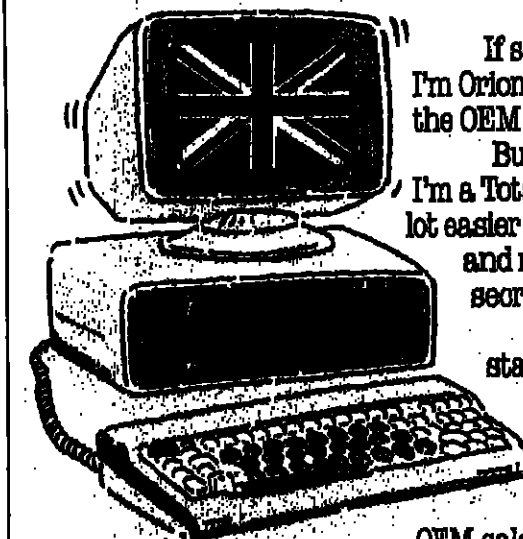
Company fringe benefits are excellent and include life insurance, pension scheme, subsidised restaurant and a free beer allowance. A contribution will be made towards relocation in deserving cases.

FULLERS

Please ring RAY SLATTERY on 01-803 8618 for further information or write to him at Datasense Limited, Blue Line House, Elys Estate, Angel Road, Edmonton, London N18 3BJ.

datasense

"HELLO, I'M ORION. CAN YOU SELL COMPUTERS?"



If so, you could be a lot better off selling me. I'm Orion... the latest in 16-bit technology from the OEM group. And I'm British.

But I'm not just another microcomputer. I'm a Total Business Management System. I'm a lot easier to sell, because I'm so good at financial and managerial functions as well as secretarial work, like word processing.

When you see my spec, you'll understand why, if you can sell computers, you should be selling Orion.

With software from Peachtree* Micro Modeller, my own and others I'm such an attractive package for the OEM sales team.

They're looking for people with proven experience in selling data systems or word processors. They'll be based in London, the Home Counties, the North and the South. There's an earning package that includes a base salary, commission, company car and the kind of employee benefits a large company can offer.

Office and Electronic Machines PLC is a leading British public company marketing a sophisticated range of advanced electronic products and services for the modern office.

If you like the sound of me, write to the Group Personnel Manager, Office and Electronic Machines PLC, 140-154 Borough High Street, London SE1 1LE. Or telephone 01-407 3191.

And remember, I'm the system you can really talk business with.

OEM
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OUTSTANDING OPPORTUNITIES IN

We have been retained by one of the fastest growing super-micro companies to recruit a number of hardware and software specialists for their UK support team. With its HQ based in the USA, this young, dynamic organisation has over achieved during its first year in the UK and has exciting but realistic short-term plans to expand into Europe. The state-of-the-art hardware design, powerful multi-user operating systems, high level languages, responsive support and price-performance edge, add up to a tremendous future. These positions carry the normal benefits associated with a leading computer company.

TECHNICAL SUPPORT CONSULTANT **£10-12K + car**
If you possess solid communications hardware knowledge with in-depth technical software experience of UNIX type systems, plus sound appreciation of such languages as PASCAL, FORTRAN, or C, this opening will present a stimulating challenge. Networking and/or Database expertise would be useful.

SOFTWARE SUPPORT TECHNICIAN **£8-10K + car**
This person must have considerable 'hands on' UNIX experience together with working knowledge of either PASCAL, FORTRAN, C, COBOL, or Assembler. The successful candidate will probably be a well-qualified programmer/analyst currently working in an academic environment but looking to broaden his/her experience with a leading manufacturer.

MANUFACTURING TECHNICIAN **£10-12K + car**
You will be an experienced mini/micro engineer with true management potential. Responsibilities will include servicing selected customers, co-ordinating administration matters, maintenance scheduling, and spares control. This position will best suit a young, energetic engineer with the necessary ambition and drive to success in a fast moving computer company. Knowledge of relevant systems software would be a distinct advantage.

Please send full CV to:
Vio Chivers
SEARCH DYNAMICS LTD
Edgbaston House
3 Duchess Place
Hagley Road
BIRMINGHAM B16 8NH
Tel: 021-455 7811

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To consolidate and sustain this growth we are seeking professionals with in-depth MVS experience to act in the forefront of our operation.

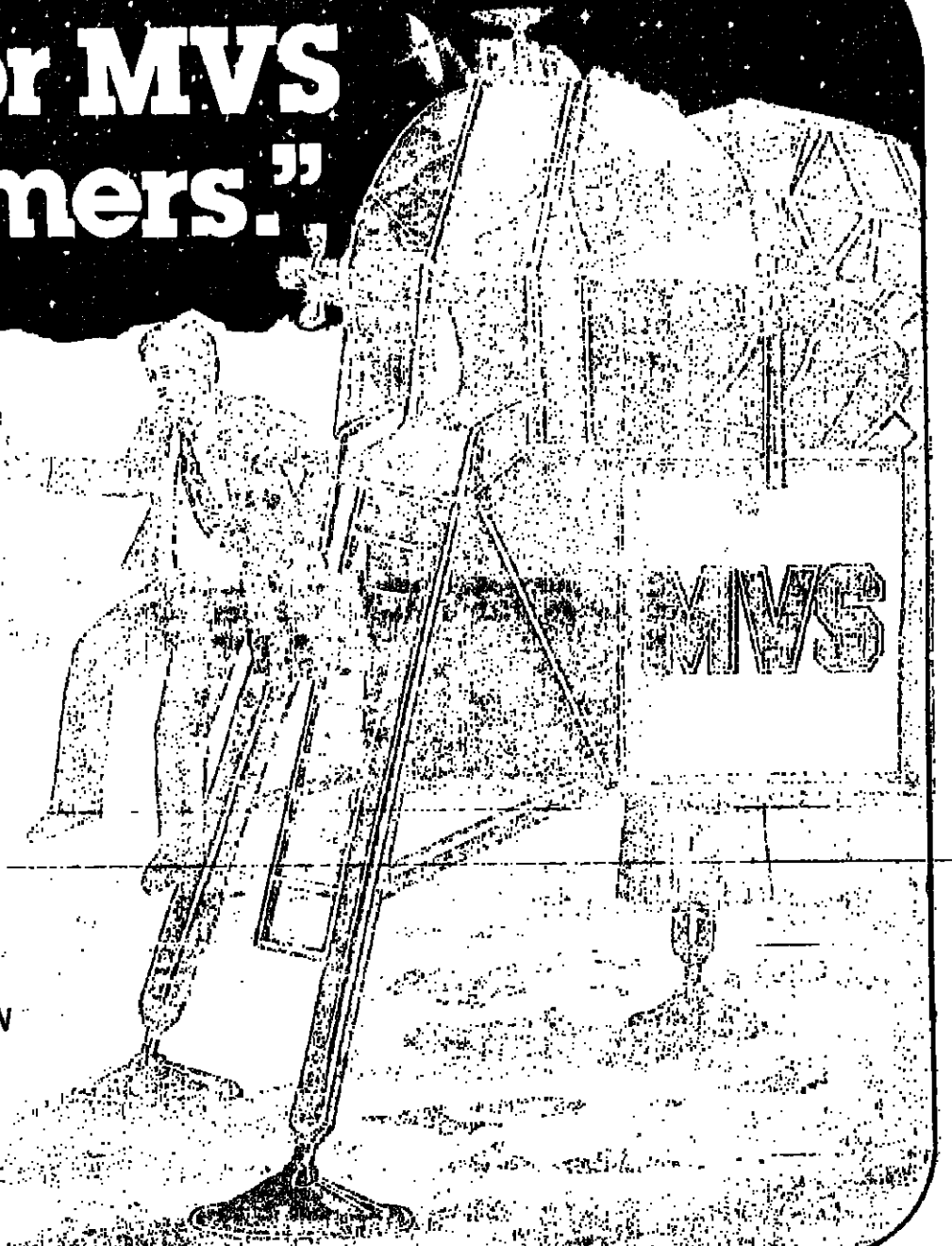
Your experience will include several of the following:

- ★ Three years' MVS systems programming
- ★ MVS intervals, especially TSO
- ★ SAS and ASSEMBLER
- ★ MVS externals; CLIST; TSO; SPFL; JCL; etc.
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For further information and an early interview contact **GORDON THOMPSON** now!

Computer Search
01-404 0152

Notwich House, 13 Southampton Place, London WC1A 2AL



DALROTH MICRO CONTRACTS HOLLAND

Our client, a Dutch software company, are involved in several exciting development programs with a large European video-games manufacturer and need the following people.

**Senior Programmer/
Project Leader
Assembler Programmer**
£400-£550 p.w.

To work on the implementation of a BASIC Interpreter to run on an existing very successful games computer. The Project Leader will have previous experience of implementing a BASIC Interpreter (ideally microsoft) coupled with good knowledge of Z80 Assembler programming. Some hardware familiarity especially interfaces would be advantageous. For the programmer position you will need at least two years' Z80 Assembler experience ideally in a technical environment.

IMMEDIATE START - 4/6 MONTH CONTRACT
Games Designer/Programmer
c. £400 p.w. negotiable

To be involved in the creative design and programming of new video games to run on both the client's video games computer as well as a range of competitors' machines. You should be creative and imaginative with previous assembler programming experience, ideally on Intel microprocessors, and should have a knowledge of computer graphics.

APRIL/MAY START
3/12-MONTH RENEWABLE CONTRACTS

For further information, please contact Colin Maalen, day 01-493 2947 or evenings/weekends 0480 214493 quoting reference 9961.

DALROTH & PARTNERS, 4 HALF MOON STREET, LONDON W1

MANAGEMENT & EXECUTIVE SELECTION

telephone
01-637 9611

ENGINEERS

MES Engineering Division has been recruiting all levels of engineers for the computer industry over the past seven years. Below are a selection from our current vacancy file. Look out for our weekly feature on engineering opportunities.

CUSTOMER ENGINEERS

London/Surrey **from £12K package + car**
A Honeywell/Univac background or two years' + mainframe/mini/perl experience. Leading edge technology. Substantial benefits. Excellent career opportunity (3305)

MICROS

London/Yorks/Anglia **to £9.5K + O/T + car**
Established fast growing manufacturer. Young qualified engineers to work on big business micros (3306).

FIELD ENGINEERS

North West/Herts/Beds **to £11K + car**
Engineers required at several levels. Wide range of PDP systems and peripherals. Interesting applications. Two year mini background (3307).

MINI/MAINFRAME

London/Berks/Bucks **£12-£14K package + car**
Leading manufacturer requires flexible engineers with good customer skills. Total systems involvement, software approach to troubleshooting (3308).

For further details contact Chris Bond on 01-637 9611

Suite 201/6 Albany House
324 Regent Street London W1 **MANAGEMENT &
EXECUTIVE SELECTION**

Communicating Success

Not since the birth of the electronic computer has there been a science with such far reaching impact as that of digital communications. As a major Systems Company whose name is synonymous with the 'State of the Art' we have been swift to recognise the importance of this technology by its prominence within our product portfolio.

We are BL Systems Limited, a multi-million pound turnover Company based at REDDITCH in the heart of the Worcestershire countryside. Our product development and support team are located at HQ and right now we are keen to attract an experienced Software Professional to join our Communications Software Group. The group is a centre of expertise on a variety of DEC based services such as VIEWSHARE and COMET, our advanced Electronic Message System. The group has a packed projects development calendar which includes the design of an Integrated Network Management product and a series of software interfaces and protocol converters to implement.

Our Candidates need not possess a communications background but they should have a sound knowledge of DEC RSX 11/M and VAX VMS internals at macro level. Fluency in a high level block-structured language, particularly PASCAL would be a definite bonus to us, as would some man-management experience.

In return for your talents, we'll reward you well, with a salary up to £12,000 per annum. Add to that a company car, bonus system and 25 days paid holiday and the benefits of joining our Company become increasingly apparent. Additionally, if you do need to relocate, we can put together a very attractive package.

For a brief qualifying discussion or to arrange an initial interview contact our Advising Consultant **Alan Carnell** on **01-935 0671** (24 hour answering service) or **Ian Payne** on **021-236 3781** (24 hour answering service) or **0827 58002** (Evenings and Weekends until 9.00pm). Alternatively you can submit your own Curriculum Vitae to our Birmingham office.



Specialist Computer Recruitment Ltd

SOUTH James House, 46 James Street, London W1M 5HS 01-935 0671/488 0401	MIDLANDS & INTERNATIONAL 35-37 Great Charles Street, Overseasway, Birmingham B3 3JY 021-236 3781	NORTH International House, 84 Deansgate, Manchester M3 2EP 061-553 0427	BELGIUM Avenue Louise 322, Belle 4, 1050 Brussels 010 322-540 7161/771	HOLLAND Willemsoordweg 82, 1071 H.M. Amsterdam 010 3120-760847
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Senior Systems Engineer

Hewlett Packard 3000
Circa £15,000

The South West
Midlands
Yorkshire

As a major industrial group, our Client has made substantial investment in the area of highly advanced computer technology, and is now poised ready for further significant development. A key element will be the implementation of an innovative UK wide communications network based around 3-4 large H.P. 3000 computers.

To ensure the success of this important project, our Client is seeking to recruit the best available in terms of Software Engineering skills. Consequently, they seek an individual specifically with in depth experience of Hewlett Packard 3000 Series, with communications experience, to take control of the technical aspects of the project, as well as operating on a consultative basis throughout Group Companies.

Precise location for this position is open to negotiation, and whilst a preference exists for the successful candidate to be located at Group Headquarters in Cardiff, it is by no means essential, and equal consideration will be given to candidates preferring to be based in the Midlands or Yorkshire.

This is undoubtedly a key appointment for the Company, and every effort will be made to attract an individual with not only the high technical expertise required but also the interpersonal skills to ensure successful interface at all levels.

In recognition of the skills required, our Client is prepared to offer an extremely attractive salary plus large Company fringe benefits which will include substantial assistance with relocation.

For an interview and further information regarding this unique and challenging opportunity, contact **Peter Lees** on **021-236 3781** (24 hour answering service) or **0902 632141** (Evenings and Weekends).

Technical, Sales & Management Appointments



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James House, 46 James Street,
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Queensway, Birmingham B3 3JY
021-236 3781

NORTH
International House, 84 Deansgate,
Manchester M3 2ER
061-833 0427

BELGIUM
Avenue Louise 327,
Boite 4, 1050 Bruxelles
010 322-840 7161/71

HOLLAND
Willemsparkweg 92,
1071 H.M. Amsterdam
010 3120-780947

(2314)

YOU CAN BENEFIT BY WORKING FOR THE LARGEST COMPUTER SERVICE COMPANY IN EUROPE AT THEIR UK HEADQUARTERS IN CAMBERLEY, SURREY

Our client is GSI, who are the largest computer service company operating in Europe today. With a wide range of hardware and products, the career pattern offered by GSI is really exceptional. The two positions advertised here offer a very real opportunity to get away from the often boring and mundane cul-de-sac in which so many programmers and operators find themselves. We have been asked to assist in the recruitment of two important positions within GSI's Motor Dealer Systems Division. Both these positions are based at GSI's United Kingdom headquarters in Camberley, Surrey.

DIBOL PROGRAMMER

Around £11,000 p.a.

We are looking for an experienced DIBOL programmer who will appreciate the opportunity provided in the GSI environment. The position involves the development and maintenance of new and existing systems and there is likely to be considerable customer contact. The ability to apply technical skill quickly to new applications is important, and a sympathetic and practical approach to customer problems is considered mandatory. At least two years' DIBOL programming experience is required and a knowledge of RSTS/E and of time-sharing would be very useful.

PRODUCTION CONTROLLER

Around £9,000 p.a.

We are looking for an IBM computer operator who wants to get ahead. This very interesting position, which involves significant customer liaison, offers a very realistic career development. You will be a self-starter who is able to get things done by personal control and patience. You will appreciate the importance of accuracy and be used to working to strict time schedules. You will welcome the opportunity to take responsibility and will retain the sense of humour that is necessary when working in a pressurised environment and at the same time dealing with customers.

Even today in the exciting world of computing it is difficult to find real career opportunities. Both of these positions offer that. Please send curriculum vitae to JVG Recruitment Ltd or telephone for application form.



RECRUITMENT LTD.

Sentry House, Frimley Road, Camberley, Surrey, England.
Tel: Camberley (0276) 29213. (24-hour answering service). Telex: 858386.

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JOHN GOLDSMITH

(2348)

Data Processing Manager

New HP 3000 installation
c.£12,000
Rural Somerset

Our Client is a division of a large multi-national, controlling the Group's activities throughout Central, Southern and South West England from its impressive Headquarters set in an attractive Somerset market town.

This is truly a "greenfield" site, and in more ways than one, as the successful applicant will be given the brief to prepare for, and manage the physical installation of a new Hewlett Packard 3000/64 later this year, thereafter becoming responsible for the first time computerisation of the Company's systems.

Our Client therefore seeks a widely experienced Systems and Programming professional, preferably with experience of Management in a Hewlett Packard 3000 environment and the technical and innovative qualities required to develop the Company's computing resource from what is now an empty room, to a medium sized D.P. Department supporting a powerful new minicomputer.

with communications links to major sites, and, possibly, a network of micros and word processors in due course.

In this very "D.P.-aware" Organisation, the DPM can be assured of full backing at Director level. Offering such a high degree of career satisfaction, supplemented by the pleasure of living and working in a picturesque corner of Somerset, this position is not one to be missed: Such opportunities are rare indeed.

Our Client offers a range of benefits which include a Company pension scheme, and full relocation assistance where required.

Suitably qualified applicants should submit a detailed CV to **Ian Payne**, Supervising Consultant at the SCR Birmingham address as soon as possible to avoid disappointment. Initial interviews will be carried out at SCR Regional offices during April.

Technical, Sales & Management Appointments



Specialist Computer Recruitment Ltd

SOUTH
James House, 46 James Street,
London W1M 5HS
01-835 0671/488 0461

MIDLANDS & INTERNATIONAL
35-37 Great Charles Street,
Queensway, Birmingham B3 3JY
021-236 3781

NORTH
International House, 84 Deansgate,
Manchester M3 2ER
061-833 0427

BELGIUM
Avenue Louise 327,
Boite 4, 1050 Bruxelles
010 322-840 7161/71

HOLLAND
Willemsparkweg 92,
1071 H.M. Amsterdam
010 3120-780947

(2314)

SALES EXECUTIVES AND SALES MANAGERS

Michael Linford Associates wish to hear from Sales Executives and Sales Managers whose track record to date has demonstrated superior ability.

You may have just completed your initial 'Sales Apprenticeship', alternatively, you may be a Senior Sales Executive or a Sales Manager/Director.

We are an established consultancy who specialise in the search and selection of sales and marketing executives for the computer industry with target earnings from £16-50,000 P.A. plus.

Perhaps your current appointment is fulfilling your career needs, but nevertheless, you are interested in future opportunities, alternatively, you may be actively seeking a new appointment now.

You may be looking for:

- ★ A higher income
- ★ A more sophisticated product
- ★ A totally professional peer group
- ★ A more authoritative role

Or more likely, a combination of all these factors, then perhaps its time you spoke to us. Bear in mind, the best position for you may never be advertised.

In the first instance telephone Steven Baker on: 01-370 2012/2013. Or send a brief CV for his attention to the address below. Any approach will be treated in the strictest confidence.

ML **Michael Linford Associates Ltd.**

Executive Search Consultants

139A Gloucester Road, London SW7. Telephone: 01-370 2012, 2013.

(2370)

CONTRACTS

PROGRAMMERS AND ANALYSTS

THE SOUTH

- ★ 8100/DPCX Cobol Programmers with financial or insurance experience.
- ★ IBM Analysts with on-line experience and knowledge of large data volume systems. CMS an advantage.
- ★ IMS DB/DC ADF Analysts/Programmers with banking experience.

OVERSEAS

- ★ ICL Programmers and Analysts at various levels with a minimum of 5 years' experience preferably on ICL 2900 with Cobol or Fortran and VMEB. IDMS Database an advantage.

For further information on these positions and also to discuss your own requirements, please contact: Jackie Robb or Sandra Monks for an appointment or send your full cv which will receive our prompt attention.

(2320)

FORCE 8 computer services

8 Mint Walk Croydon 01-680 3761

April 1, 1983

SYSTEMS AND PROGRAMMING

Founded in 1980, Shawdata is a computer services company with a reputation for providing quality solutions, on schedule, to a diverse client base. As part of a long-established £75m UK-owned group, we also provide a data processing service over a nationwide IP network to our parent group, using an ICL ME29 computer located at our group head office in Huddersfield. More recently, we have become a founder member of the successful ICL TradePoint network.

The increasing demands being placed upon our services by both our parent group and our external client base require us to recruit experienced data processing professionals to enable us to respond positively to these demands. The individuals appointed will have the opportunity to make significant contributions towards the development of a number of major projects using amongst other things, Viewdata, On-line and Database techniques.

Project Leaders

(28K-42K + Company car)
We are looking for a person experienced in the supervision of system development with a proven track record of successful implementations. As we specialise in developing effective solutions for ICL systems, at least 4 years' experience of ICL hardware and software will be required.

Analyst/Programmers

(£8K-12K + Benefits)
Applicants should be self-motivated individuals of a proven capability who can perform effectively in both internal and external client environments. At least 3 years' Cobol experience is required, ideally with ICL equipment. Recent experience of ME29 hardware and software would be particularly relevant.

If the challenge of either of the above positions is of interest to you please send your cv to:

The Personnel Manager
Shawdata, 4 Rowley Lane
Fenny Bridge, Huddersfield
W. Yorkshire HD8 0UG

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Our clients are leading manufacturers in their respective fields. All offer full training, security and the chance to work on state of the art kit.

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ADN 170

London Borough of Hounslow
Hounslow Borough College
Department of Business Studies

PROGRAMMER/ANALYST

Degree level. Knowledge of IBM, JCL, Assembler, COBOL, BLI, database retrieval techniques, with working knowledge of French. Long term contracts, salaries negotiable.

Salary £5,500-£8,247 plus LW

Application forms and further particulars from the Personnel Manager, London Road, Hounslow TW7 4HS on receipt of SAE (reply). Closing date 10 days from appearance of advertisement.

(2868)

Apply by cv, to R. S. Wilson, 11 Uxbridge Street, London W6 7TQ. Tel: 01-221 2835. Quoting Ref: RW (2862)

DATA PROCESSING MANAGER

LONDON NW2

Samuelson Group PLC, suppliers of equipment and services to the Film and Television industries, require a Data Processing Manager for an established ICL 2804, RPG2 installation. The position will carry day to day responsibility for the installation and for the future direction of its systems capability.

The successful candidate must be able to demonstrate good technical skills in all aspects of ICL 2804, RPG2 programming, systems and development experience is essential.

Applications including details of experience and current salary should be made to:

M. R. Greaves,
Samuelson Group PLC,
303-318 Cricklewood Broadway,
London, NW2 6PQ.

(2837)

BOX NUMBERS

Box number replies should be addressed to:

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MICRO PROGRAMMER LONDON £57,500

A defined career path is offered by this leading bureau in London, to a young, ambitious programmer with six months' experience of microcomputers, CPM and BASIC. Your applications are unimportant as you will be fully trained in the company's field, provided you are keen and enthusiastic. Ref. C 2216

RPG III MIDDLESEX To £12,000

Superb opportunity with a new System 38 site in Middlesex for analyst/programmers looking to develop their technical and liaison skills. If you can offer over two years' experience, with some knowledge of IBM System 38, RPG III, you could be developing a range of financial and insurance systems in a dynamic environment. Also an opportunity for a System 34/RPG II programmer with around two years' experience to train on the 38. Call for further details. Ref. C 2210

ANALYST/PROGRAMMER CITY ££11,000

Join a financial sector employer offering extensive training and realistic career and salary progression. If you can offer three/four years' IBM COBOL background using DOS/VSE this could be the ideal career move for you. The person appointed will be involved with all aspects of Data Processing Projects including feasibility investigations, analysis of user needs, program specification and programming. Conditions of service are all that could be expected from such a prestigious employer and include lunchtime vouchers, season ticket loan, and pension scheme. Ref. C 2255

PL/I MIDDLESEX £12,000

Well established commercial company are currently seeking a capable analyst/programmer with at least 12 months' experience to join their progressive development department. The successful applicant will have a good PL/I programming background in a CICS environment preferably with DOS/VSE exposure. A generous salary and benefits package is offered as well as full training in Database. Ref. D 1985

DOS/VSE, VM/CMS BERKS £8,500

Can you offer around 18 months' IBM COBOL in a DOS/VSE or VM/CMS environment? If so, this leading UK retail firm can offer you interesting development work on a range of financial systems in an on-line environment, on IBM 4341s. Ref. C 2242

PROGRAMMER/ANALYSTS To £11,000

Can you offer a minimum of 12 months' COBOL programming? If so, there is an opportunity to work for a Major Software House. They are seeking to recruit ambitious, young, dynamic DP professionals with potential to move into analysis. You will initially be trained on Wang equipment with the opportunity to work on other machines as their client base develops. Ref. G 2301

ANALYST/PROGRAMMER £9,000 +

Due to expansion this well known Essex-based firm require a capable analyst/programmer with at least 12 months' IBM COBOL background. You must be ambitious and have a desire to progress into analysis. The company currently retain an IBM 4341 under DOS/VSE with CICS and DL/I. Training given where required. Ref. G 1415

IBM MVS COBOL BERKS £8,800

Super position with Slough-based manufacturing company for a keen young programmer to develop their database and online skills. You should have around 18 months' IBM COBOL, preferably in an OS or MVS environment, and any knowledge of IMS, FORTRAN, JCL would be useful. Excellent training provided. Ref. C 4302

PDP/VAX MIDDLESEX £9,000

Interesting position for a well-educated programmer who can offer 12 months' experience of DEC PDP or VAX and RTL or VMS. You will be trained in DIBOL, and offered every opportunity to expand your analysis and liaison skills in a small team environment. After a year you may be offered the bonus of a company car to visit client sites. Ref. C 3630

LEAD PROGRAMMER LONDON £10,000 neg.

Interesting opportunity with this leading insurance company for a well-educated programmer with at least two years' DEC PDP, RSX 11M and COBOL experience to develop their database and liaison skills. You should be flexible and able to communicate well at all levels in a commercial environment. Excellent package includes mortgage subsidy and a host of other benefits. Ref. C 6301

IBM COBOL PROGRAMMER/ANALYST ESSEX £11,000

A major financial company based in Essex are currently seeking to recruit a programmer/analyst with a minimum of two years' experience on IBM 4340 exposure to CICS. You will become an integral part of a team involved in an exciting and demanding development work, prospects in the company are unlimited. The benefits include a free medical insurance, non-contributory pension scheme. Ring now for more details. Ref. G 2103

PROGRAMMERS, ANALYST/PROGRAMMERS £8,000-£14,000

Young expanding company can offer excellent career opportunities for Programmers and Programmer Analysts with proven ability in developing on-line packages for VAX and PDP 11 machines using BASIC. Their wide ranging development program will enhance your knowledge and skills, and equip you to progress rapidly within this field of work. If you enjoy the challenge outlined and are seeking for a challenging career, ring now for further details. Ref. D 2233

PRIME/FORTRAN CITY £9K

Major petroleum company are currently seeking an analyst/programmer to work in a technically challenging environment on their PRIME and FORTRAN. You should have FORTRAN expertise with good exposure to COBOL. Excellent opportunity for a competent programmer to move into an analyst/programmer to further his professional knowledge. Ref. D 2149

CICS/COBOL To £9,500

Insurance company in central London housing IBM 4341s, with DOS/VSE COBOL. CICS seek a keen enthusiastic programmer with 12 months' experience in a dynamic environment. Also an opportunity for a System 34/RPG II programmer with a range of financial applications. In addition to a defined career path, offer a subsidised mortgage, free lunches and flexi-time. Ref. C 2119

SYSTEMS ANALYST HERTS To £14,000

A DP professional is required for this firm based in Herts. The ideal applicant will have an IBM background with IMS Database. You will be involved in Design, Specification, Testing, and Implementation. An excellent package and relocation expenses are offered. For more details please ring me. Ref. G 2239

RPG II SURREY £9,500

Eighteen months' + RPG II experience, preferably gained in an on-line environment, is required by this leading firm near Groydon. You will be trained in MAAPICS and will be working in a System 34 environment. Excellent prospects for the right candidate. Ref. C 2275

IBM COBOL £8,500

Are you a graduate with at least 12 months' experience in IBM COBOL programming, coupled with good knowledge of DL/I and CICS? My client, a well known International Bank based in the City, seeks a young professional to join their small development team working on financial applications. An excellent banking package is offered together with good career prospects. Interested? Then ring for more details. Ref. G 1957

PROGRAMMERS, ANALYST/PROGRAMMERS ESSEX £8,000-£12,000

We have several clients in commercial, manufacturing and software environments seeking experienced programmers and analyst/programmers with a minimum of 12 months' ICL COBOL experience. Exposure to VME 6, VME 2800, MS 28, RPG, are of particular interest. Opportunities to become involved with customer liaison, systems design, and programming through implementation. Ref. D 1212

IBM COBOL EAST LONDON/ESSEX £9,000 neg.

This well known manufacturing concern are seeking to recruit an additional programmer to join a small development team. They house an IBM 4341 under DOS/VSE. With 18 months' IBM COBOL experience and knowledge of CICS and DL/I this could be the ideal career move. The package offered is generous and working conditions are excellent. Ref. G 2263

PROGRAMMER CITY £8,500

BROADEN YOUR HORIZONS! Join this busy development team working on absorbing new systems. Ideal opportunity to gain experience in Database, Networking and Distributed Processing. You will have around two years' IBM COBOL with VME and GEORGE III. Conditions are excellent including flexi-time, 22-day holidays and staff restaurant. Ref. D 2279

ANALYST/PROGRAMMER SUSSEX £9,000 neg.

Major electrical company are offering a rare opportunity for an accomplished ICL programmer with design expertise to work with exciting new products. Their progressive site in Sussex. You should have two to three years' COBOL experience in an on-line environment. Lots of potential for career advancement. Ref. D 2003

IBM/SENIOR PROGRAMMER HERTS To £12,000

This major commercial company are seeking to recruit a Senior Programmer with a minimum of three years' experience in an IBM environment. With your knowledge of TSO, SPP, and IMS this could be the ideal career move for you. You will be involved with exciting on-line development projects and be an important member of a team. Excellent benefits. Ref. G 2229

DEC/PDP CITY £9K

Progressive PDP 11/23 installation requires professionals with AMIS expertise to become key members of their UK operations. Excellent opportunity to extend your professional knowledge and to be rewarded with an excellent salary and full company benefit package. Ref. D 2287

SYSTEMS ANALYST CENTRAL LONDON £10,000 neg.

Established insurance company based in Central London is currently expanding its systems department and would be useful, and you should have one to two years' experience of Systems Analysis. An excellent benefits package is offered for these positions within a well established company. Ref. D 6262

Come and Support

TEXACO

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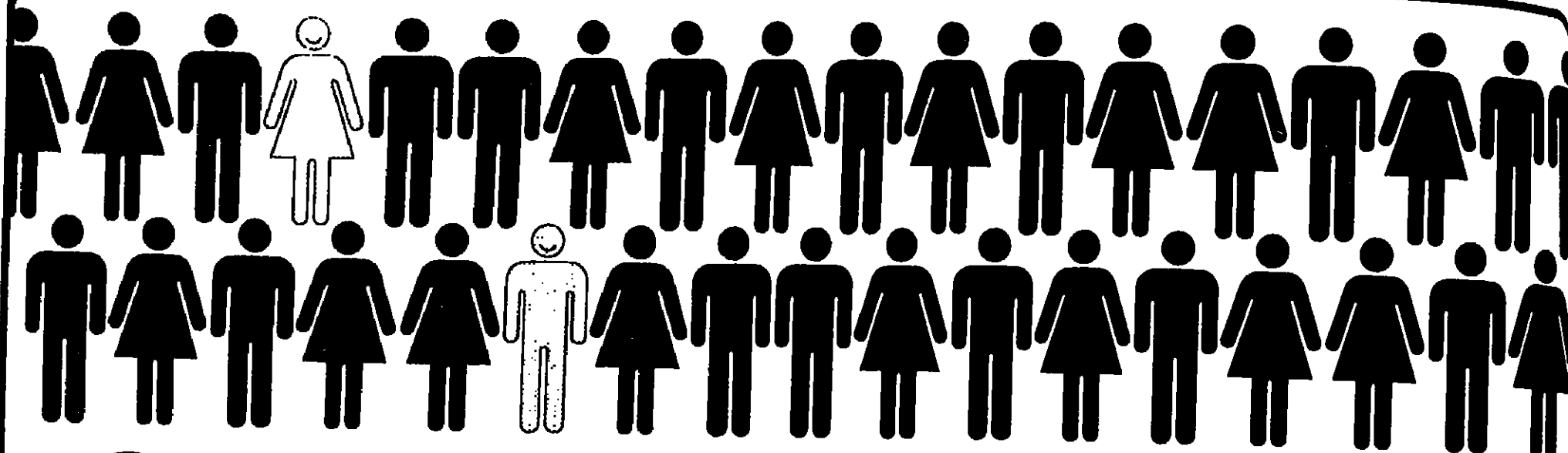
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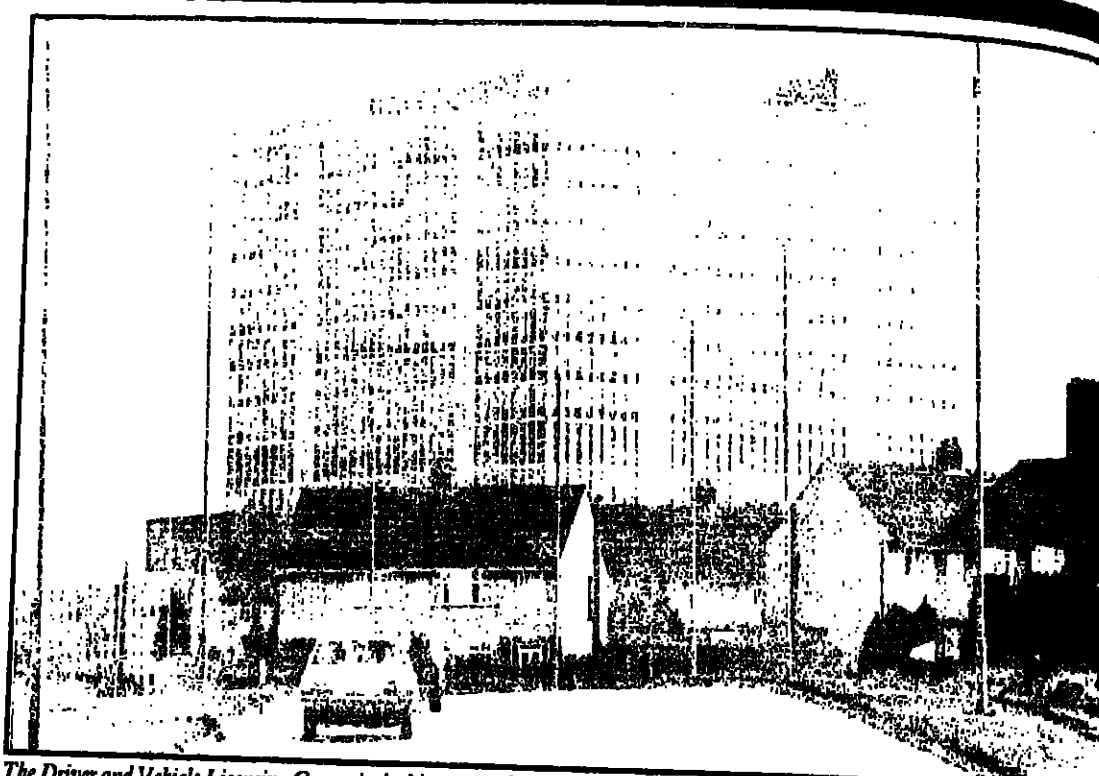
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A bright spot on a gloomy jobs horizon

Boris Sedacca finds some hope on the jobs front



The Driver and Vehicle Licensing Centre is the biggest employer of DP staff in Wales.

JOB PROSPECTS in Wales look gloomy. A quick poll of some of the larger installations in the region indicates that employers see little growth and are holding staffing levels steady if not cutting back.

However, there is one bright spot on an otherwise sombre horizon which seems to point to smaller systems as the direction for growth.

The Cardiff-based Target Computer Group has up to six vacancies at the moment, mainly for analysts and programmers. The company is a turnkey systems/software house and is looking for personnel with installation experience, particularly on small business systems.

"We are interested in people who have actually put systems into customer sites. If they maintained a payroll routine for the last three years, that type of experience is not particularly attractive to us."

"It is installation experience we are looking for," explained Chris Davis, man-

aging director of the Target Computer Group.

The type of people likely to have such experience also include data processing managers working for small to medium-sized companies apart from mainstream programmers and analysts. "Our intention is to turn such people into analysts-programmers," says Davis. An analyst/programmer is something of an all-rounder. He or she must be able to analyse the customer's commercial requirements, translate these requirements into a system specification, and so on, all the way down to nitty-gritty program coding.

This may not be too attractive to some systems analysts who prefer to have someone else do the donkey work. On the other hand, a bit of coding sharpens the wits, and furthermore, the job offers variety.

"The work we do is purely commercial, so we look for people with a minimum of two years' commercial experience. They must also get

involved in customer training - in a nutshell, they must be prepared for a true software house/turnkey role," Davis added.

The power range of machines which staff at Target work on is equally varied covering the spectrum from the IBM Personal Computer and System 23 through to the sophisticated IBM System 38.

They also work on equipment covering a number of different manufacturers, including ICL with the 2904 and ME 29, the Univac BC7 and System 80 (equivalent to the IBM System 38 with configuration prices ranging from £60,000 to £250,000), the Honeywell DPS4, the Jacquard range, the Xerox 820 micro and the Memory Computer networked micro. Apart from Target there appears to be little relief from despondency for data processing staff looking for jobs in Wales.

"We are holding our staffing levels steady, but we are always happy to receive calls

from experienced staff," said a spokesman for British Telecommunications Data Processing Executive in Cardiff, the second largest installation in Wales in terms of numbers employed after the Driver and Vehicle Licensing Centre in Swansea, with over 200 data processing staff. Half of these are data entry operators.

For those with the necessary experience, the man to contact at BTDPPE is Brian Foster on Cardiff 821251. The organisation recently took delivery of its third ICL 2960. An ICL System 4 is due to go eventually.

"We do not recruit programmers and analysts locally, only operators," said Douglas Pryce, deputy

data processing manager at BTDPPE. "We tell our headquarters in London if we see any vacancies arising, but staffing levels are determined according to a centralised plan from London. "We have just received updates to our plans which we are in the process of re-examining and I do not expect any dramatic changes to take place."

It is the same story at BP Chemicals which runs an ICL 2972 installation at its Baglan Bay Works in Port Talbot. "We are not recruiting any more data processing staff. There are no vacancies here," said a spokesman for BP Chemicals. "When we employ staff, we usually take them on from other sections

within the works." Prospects are no better at the South Wales Electricity Board according to data processing manager Bob Way. "We are not taking any people on and staff turnover is low at present because there are not many other jobs they can go to."

"That is the situation at the moment and I do not see it changing in the future," he said.

Wales Gas, which ranks as the third largest installation in the region after the DVLC and BTDPPE, is looking for two programmer analysts with a minimum of 18 months' experience. Wales Gas runs a Burroughs B4800 and B3800 at its Cardiff installation. Brindley Microcomput-

ers, based at Bridgend in mid-Glamorgan, is also looking for staff, but proprietor Gordon Brindley complained that he gets a help from the various government training schemes. Such organisations offer plenty of advice but to money, he said.

"I am looking for a certain category of staff. The people of most value to me are in the age group 18 to 25 years old, because they are receptive to new ideas," he said.

"To put it in a nutshell, I think I can get people doing useful systems work within six months, but taking a my accountant, I find I cannot get help from the government schemes unless I set up a new company."

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The candidate selected will, during the initial employment, be based at our Midlands Headquarters.

The candidate should be capable of contributing to the design and development of the product, thus gaining full product knowledge as part of this unique role. The jobholder will be involved in researching market potential prior to the sales launch and will be responsible for planning and establishing a network for sales and service.

Salary, company pension scheme and benefits are commensurate with company size. Please write giving details of qualifications, experience, and enclosing a personal photograph.

The Personnel Manager, Tatum (UK) Ltd, Hospital Street, Bridgworth, Shropshire WV16 8BU.

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Burroughs Programmers

Central London to £9,000
A leading international company requires three Programmers for a new stage of development at their West End offices.
A Burroughs medium-sized computer has been installed, so two years' experience of Cobol on this type of hardware is necessary. Exposure to DMS2 would also be very helpful and a higher salary may be paid for such experience.
GMF11/10

Systems Software Manager

SW Surrey to £16,000 + benefits
An excellent opening has arisen within our clients new IBM 30/83 computer centre for a System Programmers Manager. This new centre comprised of a number of IBM Mainframes running under a variety of MVS, VS, OS, CICS, DOS/VSE operating systems plus supporting spooling systems and TP systems procedures. The position offers the successful candidate the opportunity to plan the new centres around 10 Systems Programmers that he or she will be responsible for. Candidates must have about six years' Systems Programming experience including extensive MVS and proven supervisory experience.
GMF11/11

Senior Systems Programmers Systems Programmers

SW Surrey to £13,500 + benefits
Our clients new computer centre based around an IBM 30/83 plus additional IBM Mainframes has openings for two/three further Systems Programmers. Candidates will enjoy working in a new centre with the latest Hardware and Software facilities. Ideally the successful candidates should be aged between 25/35 with a minimum of two years' MVS rising to four years for the senior positions. Experience of DOS/VSE, VM/CMS would also be helpful.
GMF11/12

PL/1 Programmer

Slough to £9,500
A manufacturing company based in Slough is looking for a Programmer for their IBM 4341.
Candidates should have two years' PL/1 experience in DOS/VSE environment. Structured Programming techniques and DL/1 are used.
Applications are Machine Shop Loading and Order Entry.
GMF11/13

Programmer and Business Systems Analyst

Mid-Essex to £7,500
to £10,500
A market leader in the drinks industry requires two people for their IBM 4341 installation.
A young Programmer with one-two years' PL/1 and CICS experience is required to join a development team of 12 people.
The Business Systems Analyst should have good commercial systems and user experience. Knowledge of Payroll/Personnel systems would be helpful.
GMF11/14

Analyst/Programmers

Surrey/Sussex Border c£10,000
Our client, a market leader in its field, requires two Analyst/Programmers who will report to the Systems Development Manager.
One of the positions requires analysis, user exposure and PL/1 programming experience.
The other position requires RPGII programming experience and the flexibility of being able to work on other machines and a willingness to travel.
GMF11/15

ICL Systems Programmer

Middlesex £8,000-£10,000
An ICL Systems Programmer is required by our clients for their ICL 2960 installation.
Two years' minimum experience of VME or VME/B is essential for this position and if you have an applications background it will be useful when asked to give advice to applications teams whilst you specialise in the implementation of software.
GMF11/16

Senior Programmers

City - EC3 c£10,500
An international organisation in the world of shipping needs more Programmers for their large IBM 3033 in the City.
A minimum of three years' Cobol on large IBM mainframes is necessary for these positions which have scope for advancement and give excellent security.
GMF11/17

DATAMATICS
RECRUITMENT SERVICES
01-399 9183

Datamatics, Freepost, Surbiton, Surrey KT6 5BR

IBM Programmers

City - EC4 c£9,000
An international reinsurance company requires additional Programmers for on-going development work.
Candidates should have two/three years' Cobol, CICS and DOS/VSE experience for this IBM 4341 installation. The benefits of working for an insurance company are obvious, and our client is no exception.
GMF11/18

EUROPE

Senior Analyst/Programmer IBM Analyst/Programmer Programmers

Our client is currently seeking a team of IBM experienced Analyst/Programmers and Programmers to support a long term information retriever project on the continent.

Senior Analyst/Programmer

Working in the Software division you will be responsible for managing a team of four people whose objectives are:
The creation of Software to support existing and new Databases, improvement of existing files, support services and the generation of accounting and statistical programmes. The successful candidate should have a degree in computer information science, at least six years' programming to include IBM JCL, Assembler, COBOL and PL1. Familiarity with retrieval techniques, Database and Text processing, have proven man/management skills.
DLM11/1

Programmer/Analyst

Reporting to the Senior Programmer/Analyst you should have a degree plus at least five years' programming experience and the ability to program in IBM JCL, Assembler, COBOL, PL1 and be familiar with retrieval techniques, Text processing and Database operations.
DLM11/2

Programmers

Reporting to the Senior Programmer/Analyst you should have a HNC or equivalent in a computer studies subject, several years' programming experience gained in large Database operations and the ability to program in several of the following: IBM, JCL, Assembler, COBOL, PL1.
DLM11/3

EUROPE

Senior Technical Writer Technical Writer

These are continental based appointments for successful candidates whose principal responsibilities will be Technical Text Processing, Information Processing, File Maintenance and Improvements, Component cataloging and preparation of Hand Books and associated documents. The Senior Technical Writer should be qualified to HNC level in Electronic or Electrical Engineering, have at least three years' in Electrical components and circuits and the production of technical documents. Finally a knowledge of a European language would be advantageous.
DLM11/4

Technical Writer

The purpose of this position is to assist the work of the Senior Technical Writer and candidates should have compatible experience to the above position.
DLM11/5

Electronic Engineer European based

As a member of the technical operation division, the successful candidate will be responsible for providing Services/Support to the telecommunications equipment comprising of Video terminals and printers etc. You should be at least educated to HNC level in Electronic or communications, and have at least three years' experience in maintaining and repairing electronic equipment with emphasis in Data Terminal and Communications equipment.
DLM11/6

Senior Systems Designer Sunbury DEC

Our client has an urgent requirement to recruit a Senior Systems Programmer/Designer for a defence related Software development. The appointment will involve Software Design and Development on DEC based systems in the area of communications handling, multi microprocessor interfaces and the design of module specifications. Candidates should have at least five years' experience of PDP11/VAX Systems, experience of RSX11/MVS, CORAL 66 and PASCAL is essential. Additional experience of defence systems and Macro power would be advantageous.
DLM11/7

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Software Engineers Based in Switzerland

One of Switzerland's most successful companies specialising in telecommunications is expanding its development teams in a number of English speaking areas. The company is involved in a variety of systems in the Telecoms field as follows:

- ★ Public Data Switching
- ★ Public Networks
- ★ Digital Exchange
- ★ P.C. Switching Systems
- ★ Telephone
- ★ Telex
- ★ Teletex
- ★ CSDN

Candidates for permanent positions in Switzerland should fit the following criteria: a degree and a minimum of 18 months' relevant Real Time experience.

In addition successful engineers should have direct experience of at least one of the following:

- ★ Software Design
- ★ Software Development
- ★ Systems Testing
- ★ Systems Commissioning
- ★ Diagnostics
- ★ Mini/Micros
- ★ Call Handling
- ★ Processor Technology
- ★ Assembler
- ★ Chill
- ★ Coral
- ★ Pascal
- ★ Ada
- ★ System X
- ★ X25
- ★ CCITT Specs

The prospects are considerable, candidates will gain valuable experience in state of the art Telecommunications with a long term career path, involving Systems Engineering and Project Management.

Interviews will take place in London this Spring for further details of the company, conditions of employment and living in Switzerland, please send a CV or contact us by telephone quoting reference No. CWS/11/1.

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